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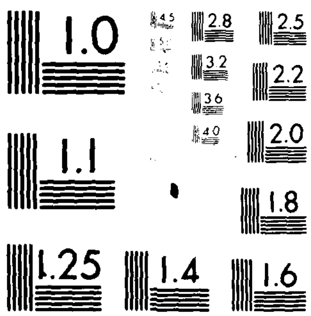

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DEPARTMENT OF TRANSPORTATION

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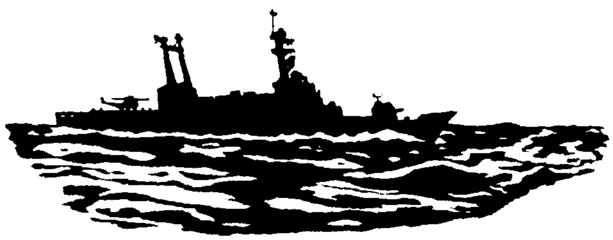
OCEANOGRAPHIC OBSERVATIONS

NORTH PACIFIC OCEAN STATION VICTOR

STANDARD SECTION P1

TERMINAL REPORT

1964-1972



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First nine frames on fiche #1 contain explanatory information.

To locate specific Table on fiche:

Refer to Table 1 - Summary of Oceanographic Observations to determine Project Name (e.g. V-7).

See below to identify proper fiche card for desired Project Name.

Project Name	Fiche
V15 - V33	1
V33 - V49	2
V49 - V67	3
V67 - P18	4
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OCEANOGRAPHIC REPORT
No. CG 373-81

OCEANOGRAPHIC OBSERVATIONS

NORTH PACIFIC
OCEAN STATION VICTOR

STANDARD SECTION P1

TERMINAL REPORT
1964-1972

Lawrence J. Hannon

December 1979
United States Coast Guard
Oceanographic Unit
Washington, D.C.

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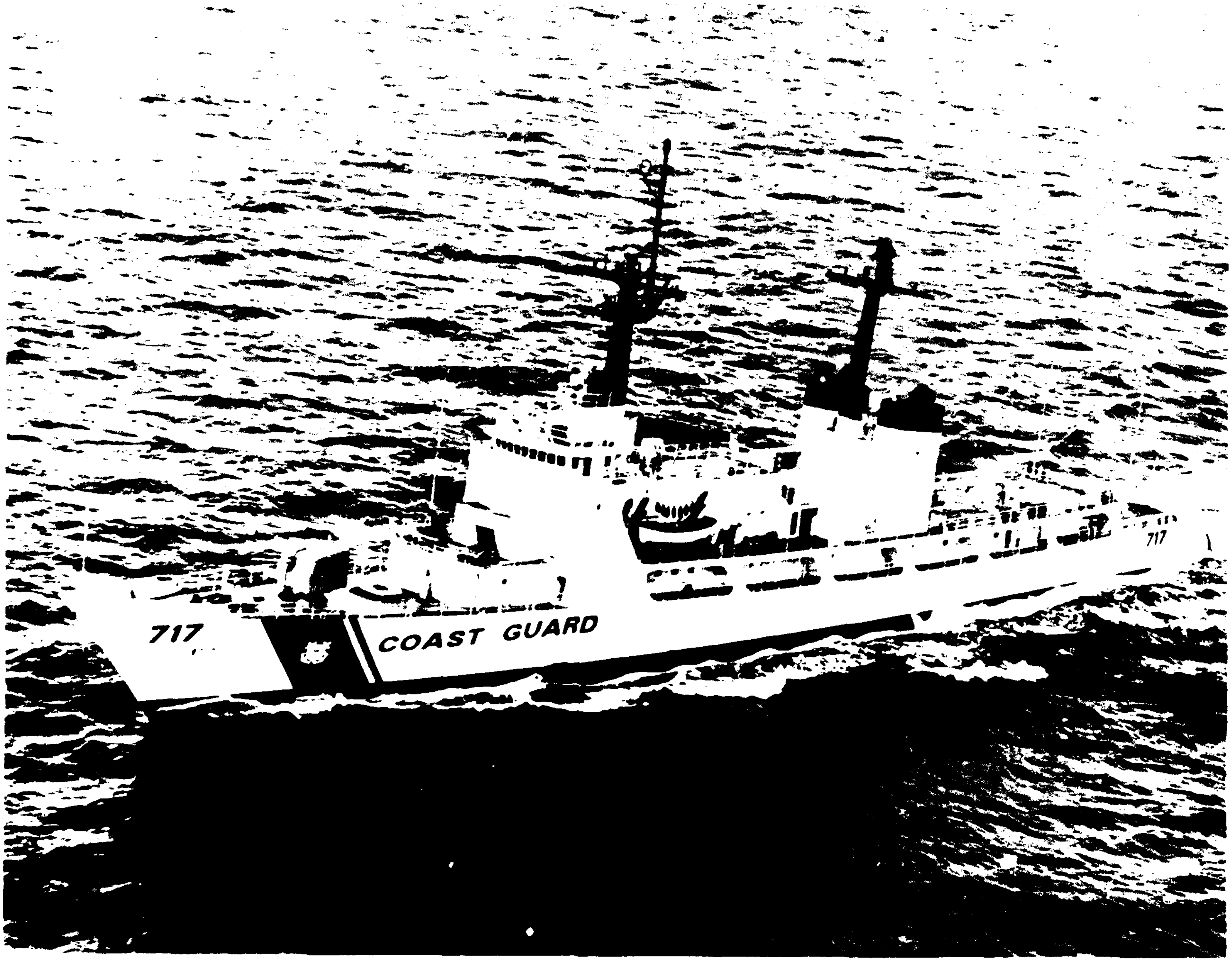

USCGC MELLON (WHEC 717)

ABSTRACT

Oceanographic data is considered for Ocean Station VICTOR (December 1964, and January 1966 to February 1972) and for the Coast Guard Standard Section P1 (January 1966 to November 1971) in the Pacific Ocean. Temperature, salinity, and sigma-t profiles of the complete occupations of Standard Section P1 for 1968 to 1971 are presented. The Kuroshio Extension meanders in and out and along P1 on all occupations. The location of the troughs and ridges of these meanders along P1 appears to be random. Ocean Station VICTOR appears to be in some part of the Kuroshio Extension (12 °C to 17 °C at 200 meters) for the majority of the period. Sub-artic Oyashio water can be seen under the Kuroshio Extension along Standard Section P1 and on Ocean Station VICTOR. The salinity minimum of this water remains 33.9 $^{\circ}/_{\circ\circ}$ to 34.1 $^{\circ}/_{\circ\circ}$, and does not appear to vary despite shifts in the axis of the Kuroshio Extension.

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North Pacific Ocean Station VICTOR (1964 to 1972) And Standard Section P1 (1966 to 1971) Terminal Report

By

Lawrence J. Hannon[1]

INTRODUCTION

Ocean Station VICTOR (34°00'N, 164°00'E) located in the Western North Pacific Ocean was occupied in December 1964, and then almost continuously with few exceptions from January 1966 until January 1972 when it was discontinued (Table 1). Standard Section P1, located along 34°00'N from 164°00'E to 141°35'E (fig. 1), was occupied two to five times per year from January 1966 until November 1971 when it was discontinued (Table 1).

VICTOR occupations V1 to V7 were covered in detail by Husby (1967) and occupations V8 to V15 and P1 occupations P1-1 to P1-4 were covered in detail by Shuhy and Husby (1969). The oceanographic data for these occupations are contained in the back of these two reports. The remainder of the occupations for VICTOR, V16 to V81 and P1, P1-5 to P1-19 are covered in detail in this report with the oceanographic data listings in Appendix A. The main features for the entire period of occupations of VICTOR and P1 are discussed.

DATA ACQUISTION

Ocean Station vessels normally maintained a position within a 10 nautical mile (18.5 km) square grid centered on VICTOR. On P1 Coast Guard vessels attempted to maintain positions within 5 nautical miles (9.3 km) of the positions indicated in figure 1.

The Nansen cast sampling program for the vessels on VICTOR from 1964 to 1972 was one cast per day to 1500 meters while on station. A deep cast was attempted to near bottom at least once during an occupation. The desired sampling depths for the shallow Nansen casts were 0, 10, 30, 50, 75, 100, 150, 200, 300, 400, 600, 800, 1000 and 1500 meters. From November 1969 to January 1972 an extra bottle was added at 700 meters in order to determine more accurately the salinity minimum. The desired depths for deep casts were 2000, 2500, 3000, 3500, 4000, 4500, 5000 meters and a bottle 50 meters off the bottom.

The Nansen cast sampling program for the vessels occupying P1 from 1966 to 1971 for the shallow casts was the same as stated above for VICTOR. There were three deep casts required on P1 at stations 5, 10, and 15. The desired depths for the deep casts on station 5 were 2000, 2500, 3500, 4000, 5000, 6000 meters and bottle 50 meters off the bottom. The desired depths for the deep casts on stations 10 and 15 were the same as for station 5 except the 6000 meter bottle was dropped.

TIME SERIES DATA FOR OCEAN STATION VICTOR

The monthly mean temperature and salinity time series were computed for standard depths for all stations taken within a 30 nautical mile (56 km) radius of the ocean station (figs. 2 and 3). The sea surface temperature varied seasonally and reached a maximum generally in August and a minimum in February-March (fig. 2). The rest of the water column responded to seasonal changes to some extent but large non-seasonal variations were also present and frequently dominated. These non-seasonal variations were the results of the fluctuations of the Kuroshio Extension across VICTOR and will be discussed in the next section.

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The surface salinity minimum corresponded to the surface temperature maximum (figs. 2 and 3). The surface salinity maximum generally corresponded to the surface temperature minimum (figs. 2 and 3).

FLUCTUATION OF THE KUROSHIO EXTENSION THROUGH STANDARD SECTION P1

The mean path of the Kuroshio current falls along 35 °N (Uda, 1964) (fig. 4). It is known that the Kuroshio extends for a considerable distance eastward (fig. 4). This extension is frequently referred to in literature as the Kuroshio Extension (The Kuroshio, 1970 and Kuroshio, 1972). Standard Section P1 was to the south of the mean path of the Kuroshio Extension, along the 34 °N parallel (fig. 1). Meanders to the south of the Kuroshio Extension from 35 °N were generally of the amplitude of 80 to 200 nautical miles (148 to 444 km) with wave lengths of about 300 to 500 nautical miles (556 to 936 km) (Uda, 1964). These meanders fluctuated in and out of P1.

Uda (1964) describes the Kuroshio as always having surface temperatures greater than 15 °C and commonly 20 °C or more, to depths of at least 100 meters. The salinity is described as more than 34.5 ‰ with a core of maximum salinity of 34.9 ‰ to 35.1 ‰. However, the Kuroshio is modified as it flows out from the coast by the addition of coastal and shelf waters, sub-arctic waters, sub-tropic waters and upwelled deep water (Uda, 1964).

The Kuroshio Extension was, therefore, modified Kuroshio water. Husby (1970) described two warm (17 °C to 19 °C) high salinity (34.6 ‰ to 34.8 ‰) cores in January and July of 1966 on P1-1 and P1-2 respectively. Generally these temperatures and salinities appeared to be characteristic of the Kuroshio Extension on P1 and VICTOR.

The 15 °C isotherm at 200 meters approximated the axis of maximum current in the Kuroshio regardless of the season or the year (Uda, 1964). Examination of the CSK Atlases of the Japanese Oceanographic Data Center for 1965 to 1970 confirmed that the 15 °C isotherm was a good indicator of the axis of maximum current in the Kuroshio Extension for both winter and summer. An example of this correlation was given by the dynamic depth anomalies and the 200 meter temperature distributions for Winter 1965-1966 and Summer 1966 (figs. 5, 6, 7, and 8). These two periods were the only periods for winter and summer from 1965 to 1970 where enough data was available to define the Kuroshio Extension out to 160 °E. The isotherms of 12 °C to 17 °C at 200 meters were also consistent with the main stream of the Kuroshio Extension regardless of season or year.

Another feature of the Kuroshio Extension was the salinity minimum found beneath the current between 600 to 800 meters. Apparently this was the result of mixing of sub-arctic Oyashio water with the Kuroshio (Reid, 1965). Uda (1964) described this water mass as an "Intermediate Water" with salinities of 34.0 ‰ to 34.3 ‰ between 600 and 800 meters, with temperatures from 6 °C to 8 °C. Husby's (1970) description was slightly different, where the salinity minimum between 600 to 800 meters was described as sub-arctic Oyashio water with salinities of 33.9 ‰ to 34.1 ‰ and temperatures less than 8 °C. Once again this water mass underwent some modification, as did the Kuroshio, as it flowed out as part of the Kuroshio Extension into the area of P1 and VICTOR.

The meanders of the Kuroshio Extension on P1, with the sub-arctic Oyashio water beneath it, can be seen in the temperature, salinity, and sigma-t profiles for P1-6, 8, 11, 12, 13, 15, and 16 (figs. 9 to 29). P1-5, 7, 9, 10, 14, 17, 18, and 19 were not plotted since these occupations were not completed. However the data for all occupations, P1-5 to P1-19, are listed in Appendix A.

Unfortunately not enough complete occupations of P1 for each season were made to determine if there were any seasonality to the fluctuations. Determination of the velocity of the flow was not possible via the classical dynamical height method since P1 was parallel to the Kuroshio Extension. The dynamical method requires that a section be perpendicular to the flow. However it was possible to determine the fluctuation of the axis of the Kuroshio Extension along P1 by plotting the 200 meter temperature value of the P1 sections (fig. 30).

Since the 12 °C to 17 °C isotherms at 200 meters indicated the main stream of the Kuroshio Extension, figure 30 is a representation of the horizontal shifting of the axis along P1. A fluctuation from 17 °C to lower temperatures and then back to 17 °C indicated that the Kuroshio Extension was shifting from north of P1 southward and then back again.

The pattern of troughs (southern excursions) of the Kuroshio was described by Uda (1964) as almost always occuring at 146°—148 °E and 152°—155 °E, with ridges (northern excursion) at 140 °E, 143°—145 °E, 150°—151 °E and 157 °E. A trough would be a decrease in temperature followed by an increase, while a ridge would be the reverse. The pattern of troughs and ridges agrees with Uda to some extent, but appears more random than he has indicated (fig. 30).

FLUCTUATION OF THE KUROSHIO EXTENSION ACROSS OCEAN STATION VICTOR

The fluctation of the Kuroshio Extension across VICTOR should be similar to the fluctuations along P1, since VICTOR was simply the far eastern end of P1. The meanders on VICTOR can also be described by use of the variation of the 200 meter temperature. The temperature timé series (fig. 2) previously discussed is to a large extent the monthly mean variation of the axis of the Kuroshio Extension on VICTOR. In order to get some idea of the year to year variability of the axis of the Kuroshio Extension the 200 meter monthly mean temperatures were taken from the temperature time series and plotted for each year, 1964 to 1972 (fig. 31).

The interesting result was that VICTOR was in some part of the Kuroshio Extension for most of the period. The 200 meter monthly mean temperature was almost always between 12 °C and 17 °C, the main stream of the Kuroshio. There appeared to be no consistant seasonal or yearly variation.

Variations of the meanders of the Kuroshio Extension occured from day to day. This was evidenced by the differences in the two meander patterns on P1 in June 1970 (fig. 30). To get some idea of the daily variation of the day to day values, the 200 meter temperatures on VICTOR were plotted for 1971 (fig. 32). The year 1971 was choosen simply because it had a large data base. Along with the 200 meter temperature value, the salinity maximum (0 to 200 meters) and the salinity minimum (greater than 200 meters) were also plotted to determine the respective characteristics of the Kuroshio Extension and the sub-arctic Oyashio water.

The amplitude of the day to day variation of the axis of the Kuroshio Extension frequently was quite large (fig. 32). There appeared to be a relatively smooth trend as the Kuroshio Extension shifted to below VICTOR by August and then back again. However, 1971, according to the monthly mean 200 meter temperatures (fig. 31) was the only year to exactly follow this pattern from 1964 to 1972.

The salinity maximum increased to 34.8 ‰ or greater along the southern wall of the Kuroshio Extension and decreased to slightly less than 34.6 ‰ along the northern wall. This agreed exactly with Husby's (1970) observations for the Kuroshio Extension and was consistant with the decrease expected along the northern wall due to the mixing of the less saline Oyashio front with the Kuroshio. In the one instance when the Kuroshio Extension passed completely south of VICTOR (August 1971) the salinity dropped to 34.5 ‰ and most of the water column was much less saline than the Kuroshio Extension water (VICTOR Cruise V74, stations 3 to 18, Appendix A, Table LIX).

The salinity minimum of the sub-arctic Oyashio water remained remarkably constant regardless of the variation of the axis of the Kuroshio Extension (fig. 32). It showed a rather regular fluctuation and did not respond at all when the Kuroshio Extension shifted to the south of VICTOR in August. The salinity range stayed well within the 33.9 ‰ to 34.1 ‰ salinity values for sub-arctic Oyashio water (Husby, 1970).

SUMMARY

The Kuroshio Extension meandered in and out of Standard Section P1 in an apparently random undulation. Ocean Station VICTOR, at the far end of Standard Section P1, was within the confines of the Kuroshio Extension for the majority of the period 1964 to 1972. Just as with P1 there seemed to be no seasonal or annual variation to the shifting of the axis of the Kuroshio Extension on VICTOR. The sub-arctic Oyashio water, on Ocean Station VICTOR, under the Kuroshio Extension maintained an almost constant salinity range regardless of the shift of the axis.

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OCEAN STATION VICTOR

CRUISE NUMBER	COAST GUARD CUTTER	DATES	NUMBER OF STATIONS	NODC REFERENCE NUMBER
V-1	CGC BERING STRAIT	12/02/64-12/09/64	8	31-0397
V-2	CGC CHAUTAUQUA	01/04/66-01/22/66	10	31-0440
V-3	CGC CHAUTAUQUA	02/13/66-02/28/66	10	31-0756
V-4	CGC WINNEBAGO	03/27/66-04/16/66	19	31-0696
V-5	CGC WINNEBAGO	05/08/66-05/26/66	20	31-0696
V-6	CGC BERING STRAIT	06/19/66-07/07/66	20	31-0793
V-7	CGC BERING STRAIT	07/31/66-08/19/66	18	31-0798
V-8	CGC WINNEBAGO	10/02/66-10/21/66	18	31-0902
V-9	CGC WINNEBAGO	11/13/66-12/03/66	18	31-0905
V-10	CGC BERING STRAIT	12/27/66-01/13/67	8	31-0873
V-11	CGC BERING STRAIT	02/09/67-02/25/67	11	31-0873
V-12	CGC MINNETONKA	03/21/67-04/07/67	10	31-1065
V-13	CGC MINNETONKA	05/03/67-05/19/67	13	31-1065
V-14	CGC WINNEBAGO	07/02/67-07/23/67	21	31-1139
V-15	CGC WACHUSETT	09/24/67-10/15/67	11	31-1196
V-16	CGC WACHUSETT	11/05/67-11/26/67	7	31-1198
V-17	CGC KLAMATH	02/18/68-03/10/68	9	31-1276
V-18	CGC WINNEBAGO	03/10/68-03/31/68	7	31-1242
V-19	CGC KLAMATH	03/31/68-04/21/68	18	31-1278
V-20	CGC CHAUTAUQUA	04/21/68-05/12/68	10	31-1252
V-21	CGC WINNEBAGO	05/12/68-06/02/68	10	31-1268
V-22	CGC MELLON	06/02/68-03/23/68	14	31-1279
V-23	CGC CHAUTAUQUA	06/23/68-07/14/68	18	31-1309
V-24	CGC BERING STRAIT	07/14/68-08/04/68	20	31-1315
V-25	CGC MELLON	08/04/68-08/25/68	12	31-1313
V-26	CGC CHAUTAUQUA	08/25/68-09/15/68	14	31-1322
V-27	CGC BERING STRAIT	09/15/68-10/06/68	19	31-1346
V-28	CGC MELLON	10/06/68-10/27/68	10	31-1345
V-29	CGC CHAUTAUQUA	10/27/68-11/17/68	1	31-1344
V-30	CGC BERING STRAIT	11/17/68-12/08/68	20	31-1411
V-31	CGC MELLON	12/08/68-12/29/68	7	31-1391
V-32	CGC CHAUTAUQUA	12/29/68-01/19/69	9	31-1412
V-33	CGC PONTCHARTRAIN	01/19/69-02/09/69	12	31-1417
V-34	CGC BERING STRAIT	02/09/69-03/02/69	17	31-1427
V-35	CGC BERING STRAIT	03/23/69-04/13/69	21	31-1429
V-36	CGC GRESHAM	04/13/69-05/04/69	16	31-1465
V-37	CGC MELLON	05/04/69-05/25/69	14	31-1455
V-38	CGC GRESHAM	05/26/69-06/15/69	21	31-1487
V-39	CGC CHAUTAUQUA	06/15/69-07/06/69	18	31-1491
V-40	CGC BERING STRAIT	07/06/69-07/27/69	20	31-149[illegible]
V-41	CGC MELLON	07/27/69-08/17/69	12	31-1488
V-42	CGC CHAUTAUQUA	08/17/69-09/07/69	20	31-1541
V-43	CGC BERING STRAIT	09/07/69-09/28/69	20	31-1532
V-44	CGC CHAUTAUQUA	09/28/69-10/19/69	15	31-1543
V-45	CGC WINNEBAGO	10/19/69-11/09/69	14	31-157[illegible]
V-46	CGC BERING STRAIT	11/09/69-11/30/69	20	31-1579
V-47	CGC WINNEBAGO	11/30/69-12/18/69	2	31-1575
V-48	CGC BERING STRAIT	12/18/69-01/11/70	20	31-1561
V-49	CGC CHAUTAUQUA	01/11/70-02/01/70	7	31-1567
V-50	CGC WINNEBAGO	02/01/70-02/22/70	8	31-1603
V-51	CGC BERING STRAIT	02/22/70-03/15/70	8	31-1609
V-52	CGC WINONA	03/15/70-04/05/70	8	31-1639
V-53	CGC CHAUTAUQUA	04/05/70-05/01/70	22	31-1628
V-54	CGC MINNETONKA	05/17/70-06/07/70	21	31-1660
V-55	CGC WACHUSETT	06/07/70-06/28/70	19	31-1787
V-56	CGC MINNETONKA	06/28/70-07/19/70	21	31-1662
V-57	CGC WACHUSETT	07/19/70-08/09/70	20	31-1789
V-58	CGC WINNEBAGO	08/09/70-08/30/70	19	31-1767
V-59	CGC CHAUTAUQUA	08/30/70-09/20/70	15	31-1756
V-60	CGC MELLON	09/20/70-10/11/70	9	31-1761
V-61	CGC WINNEBAGO	10/11/70-11/01/70	19	31-1769
V-62	CGC MELLON	11/22/70-12/13/70	6	31-1799
V-63	CGC CHAUTAUQUA	12/13/70-01/03/71	10	31-1818
V-64	CGC MELLON	01/03/71-01/24/71	10	31-1801
V-65	CGC WINNEBAGO	01/24/71-02/14/71	5	31-1804
V-66	CGC CHAUTAUQUA	02/14/71-03/07/71	10	31-1820
V-67	CGC MINNETONKA	03/07/71-03/28/71	14	31-1845
V-68	CGC TANEY	03/28/71-04/18/71	19	31-1864
V-69	CGC MINNETONKA	04/18/71-05/09/71	20	31-1847
V-70	CGC TANEY	05/09/71-05/30/71	21	31-1864
V-71	CGC WACHUSETT	05/30/71-06/20/71	12	31-1946
V-72	CGC WINNEBAGO	06/20/71-07/11/71	20	31-1867
V-73	CGC WACHUSETT	07/11/71-08/01/71	16	31-1948
V-74	CGC KLAMATH	08/01/71-08/22/71	20	31-1943
V-75	CGC PONTCHARTRAIN	08/22/71-09/12/71	15	31-1937
V-76	CGC KLAMATH	09/12/71-10/03/71	13	31-1945
V-77	CGC PONTCHARTRAIN	10/03/71-10/24/71	21	31-19[illegible]
V-78	CGC WINONA	10/24/71-11/14/71	14	31-1995
V-79	CGC CHAUTAUQUA	11/14/71-12/05/71	10	31-1960
V-80	CGC WINONA	12/05/71-12/26/71	7	31-1997
V-81	CGC MELLON	12/26/71-01/22/72	5	31-1977

Table 1.—Summary of Oceanographic Observations on Ocean Station VICTOR, 1964-1972.

STANDARD SECTION P1

CRUISE NUMBER	COAST GUARD CUTTER	DATES	NUMBER OF STATIONS	NODC REFERENCE NUMBER
P1-1	CGC CHAUTAUQUA	01/22/66-01/27/66	15	31-0939
P1-2	CGC BERING STRAIT	07/08/66-07/14/66	17	31-0793
P1-3	CGC BERING STRAIT	01/14/67-01/18/67	8	31-0873
P1-4	CGC WACHUSETT	10/14/67-10/17/67	12	31-1198
P1-5	CGC KLAMATH	03/10/68-03/14/68	11	31-1278
P1-6	CGC BERING STRAIT	02/28/69-03/04/69	14	31-1428
P1-7	CGC GRESHAM	05/03/69-05/06/69	8	31-1486
P1-8	CGC CHAUTAUQUA	09/22/69-09/26/69	15	31-1542
P1-9	CGC WINNEBAGO	11/26/69-11/29/69	7	31-1574
P1-10	CGC BERING STRAIT	11/29/69-12/02/69	5	31-1580
P1-11	CGC MINNETONKA	06/06/70-06/09/70	13	31-1661
P1-12	CGC WACHUSETT	06/26/70-06/30/70	12	31-1788
P1-13	CGC WINNEBAGO	10/05/70-10/10/70	13	31-1766
P1-14	CGC MELLON	12/15/70-12/18/70	9	31-1800
P1-15	CGC MINNETONKA	03/27/71-03/31/71	16	31-1846
P1-16	CGC TANEY	04/16/71-04/21/71	16	31-1864
P1-17	CGC WACHUSETT	06/20/71-06/25/71	11	31-1947
P1-18	CGC KLAMATH	08/19/71-08/25/71	11	31-1944
P1-19	CGC WINONA	11/13/71-11/17/71	12	31-1996

Table 1.—Continued. Summary of Oceanographic Observation on Standard Section P1, 1966-1971.

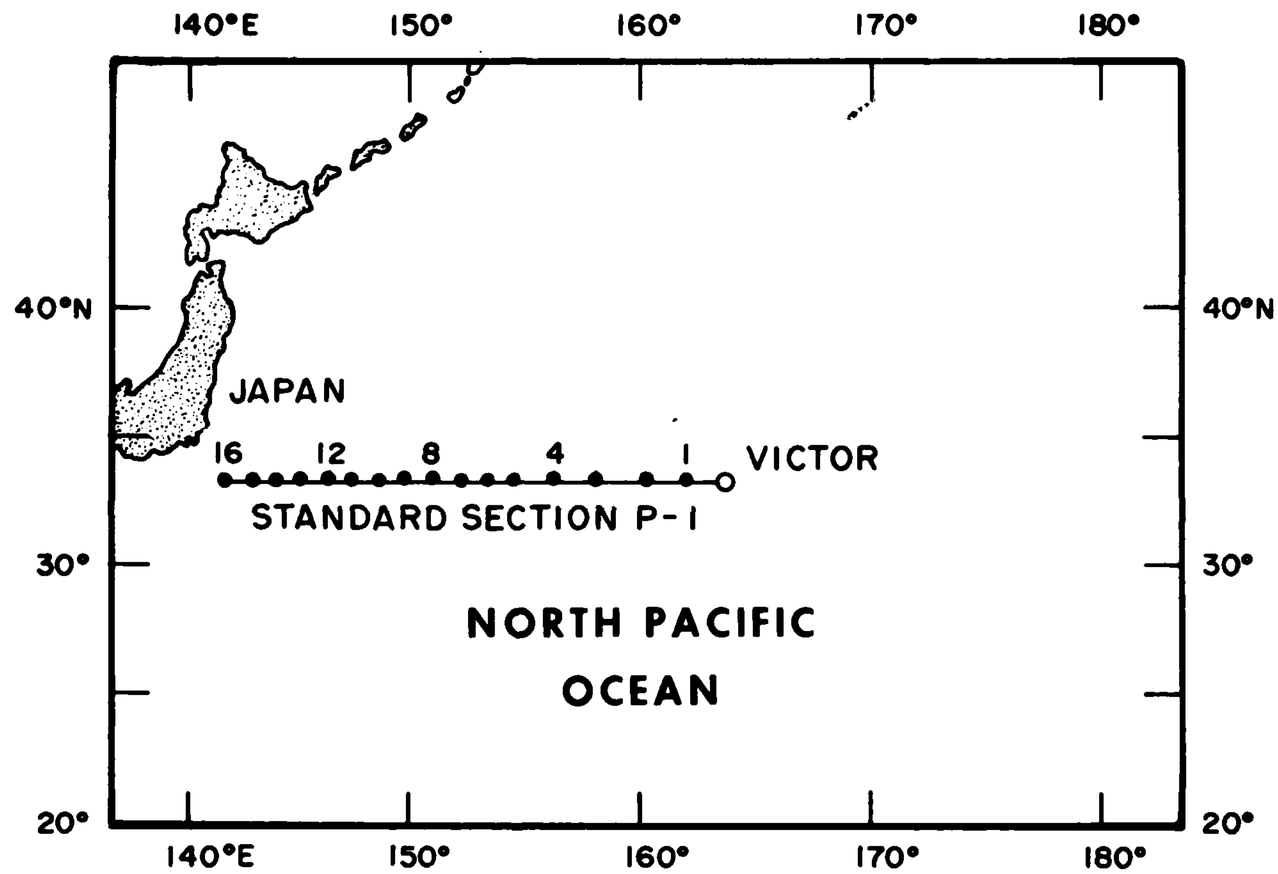


Figure 1.—Location of Ocean Station VICTOR and Standard Section P1, 1964 to 1972.

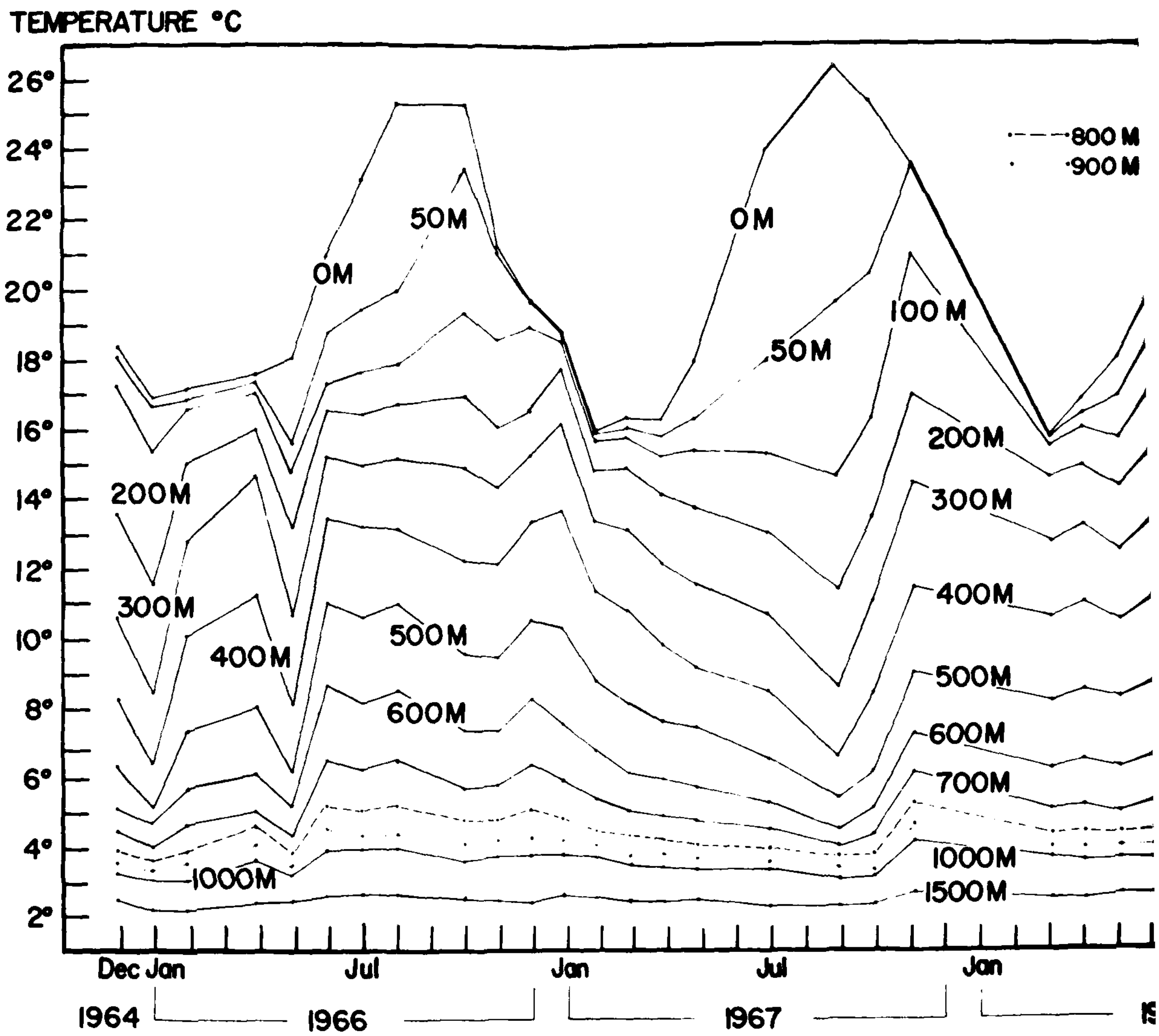
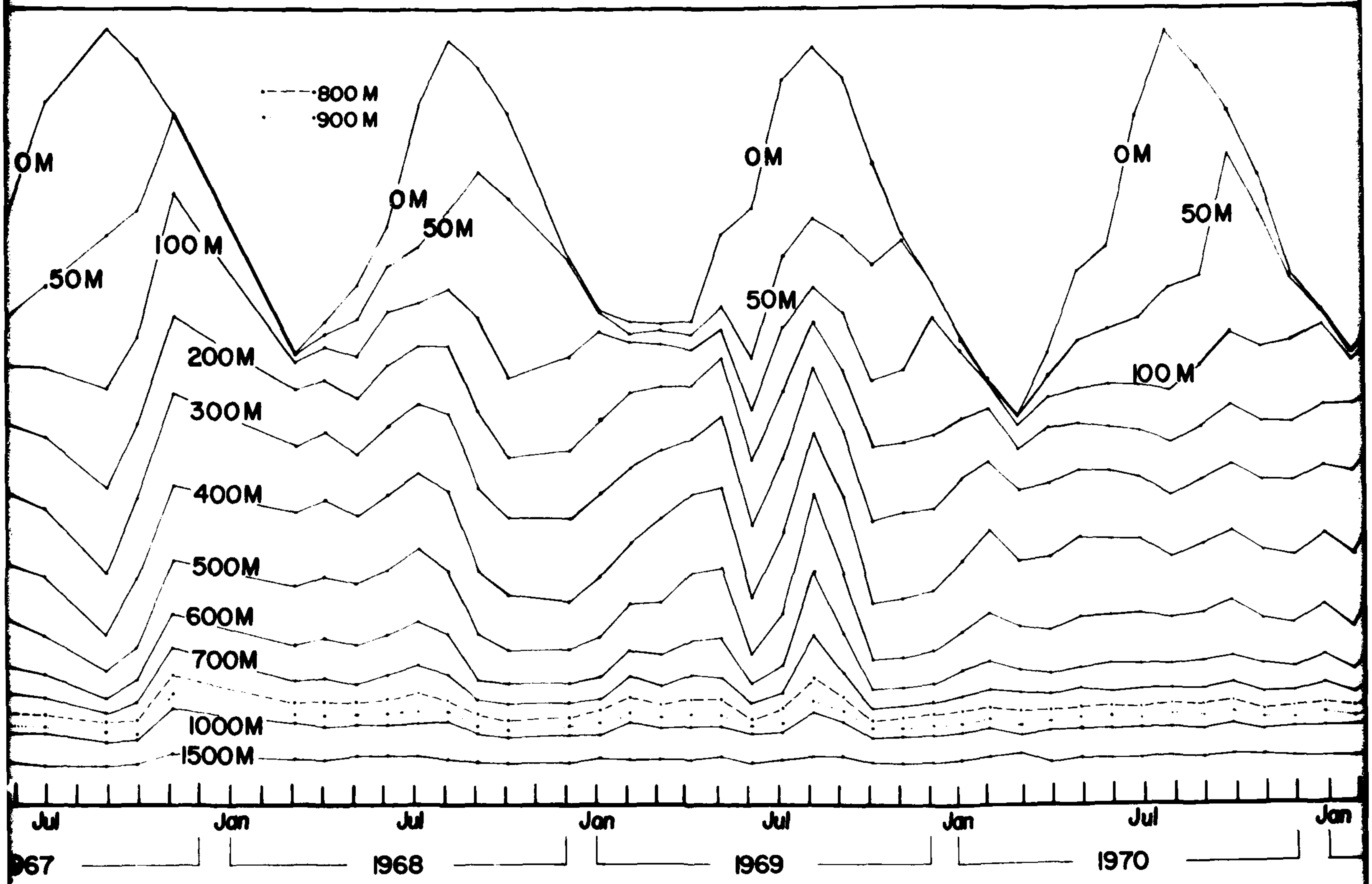
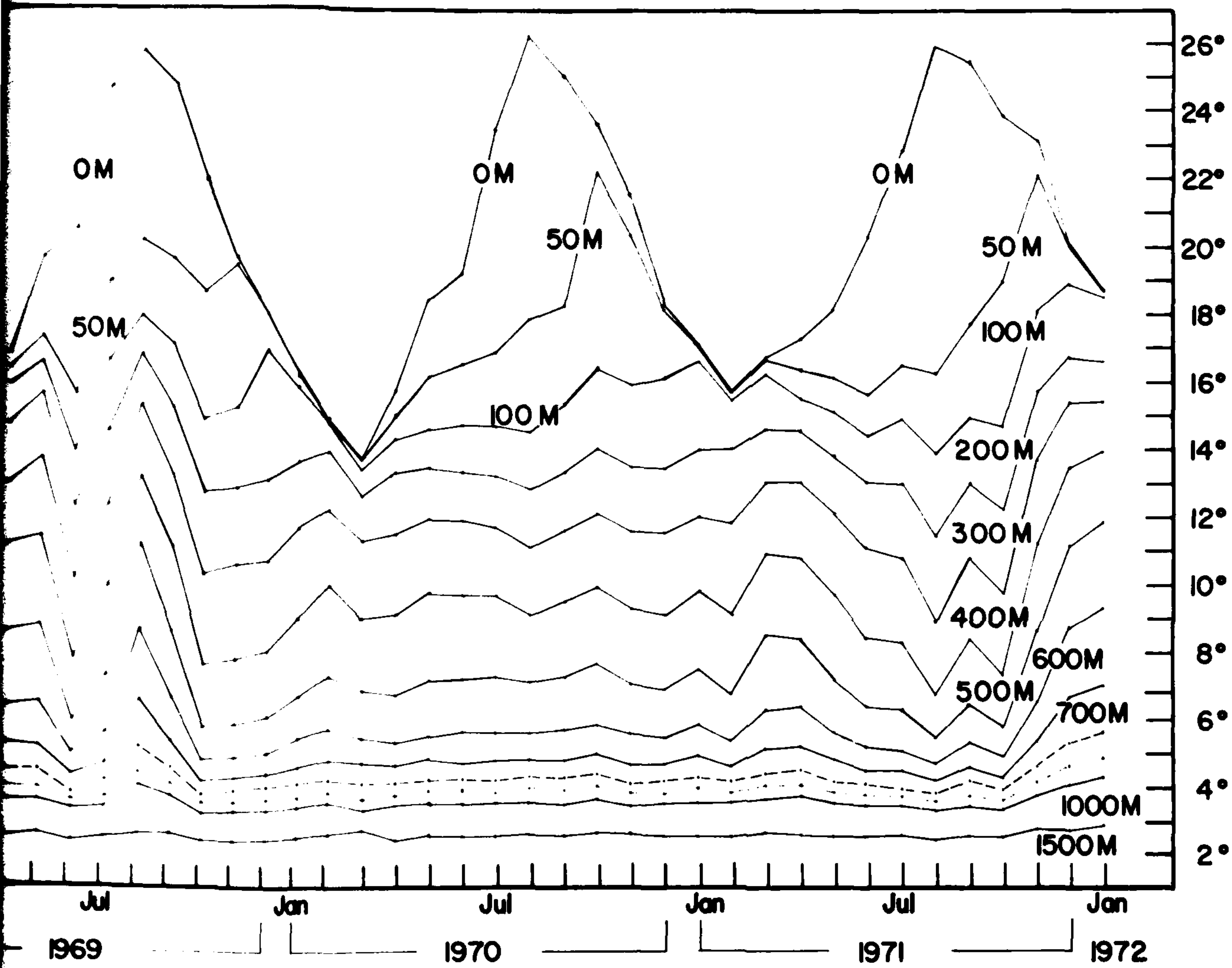


Figure 2.—Monthly averaged temperature versus time at selected depths on Ocean Station VICTOR, Decer



epths on Ocean Station VICTOR, December 1964, January 1966 to January 1972.



0M
50M
0M
50M
100M
0M
50M
100M
200M
300M
400M
500M
600M
700M
1000M
1500M
26°
24°
22°
20°
18°
16°
14°
12°
10°
8°
6°
4°
2°
Jul
Jan
Jul
Jan
Jul
Jan
1969
1970
1971
1972

uary 1972.

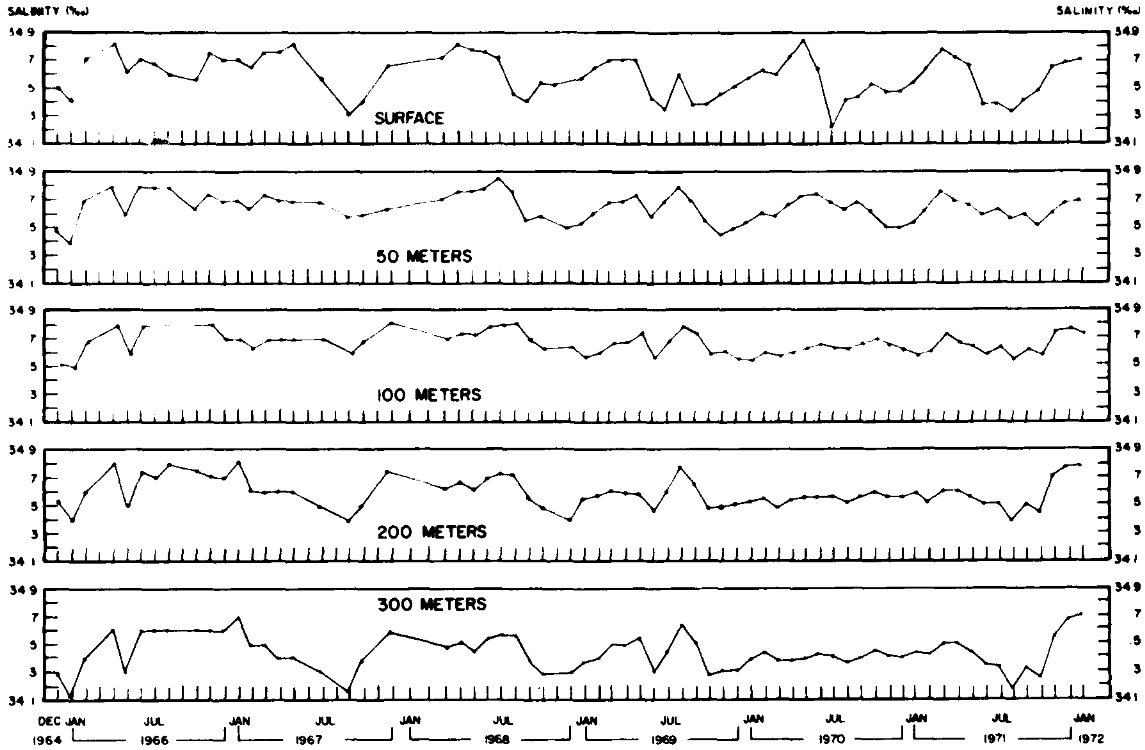


Figure 3.—Monthly averaged salinities versus time at selected depths on Ocean Station VICTOR, December 1964, January 1966 to January 1972.

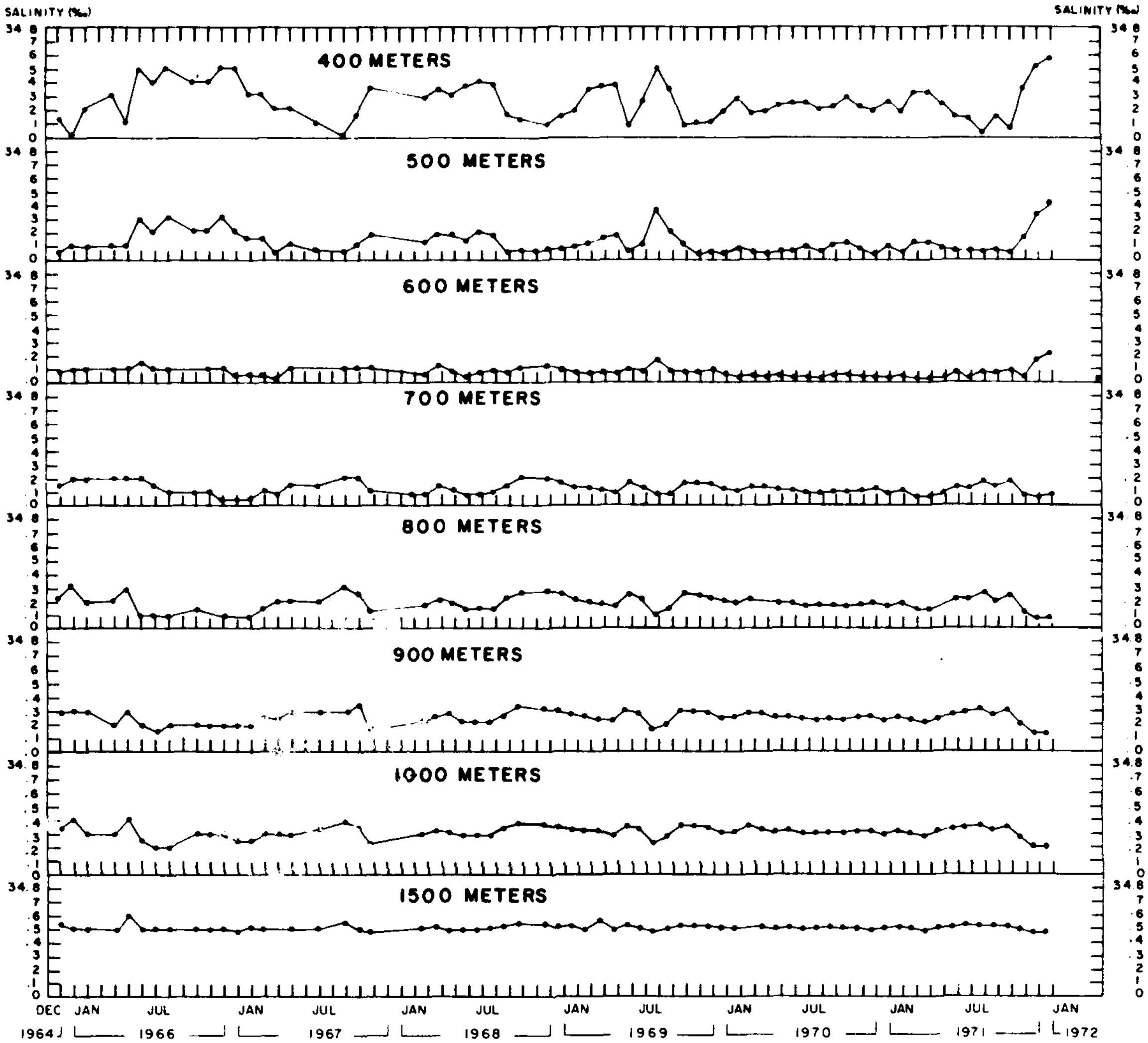


Figure 3.—Continued.

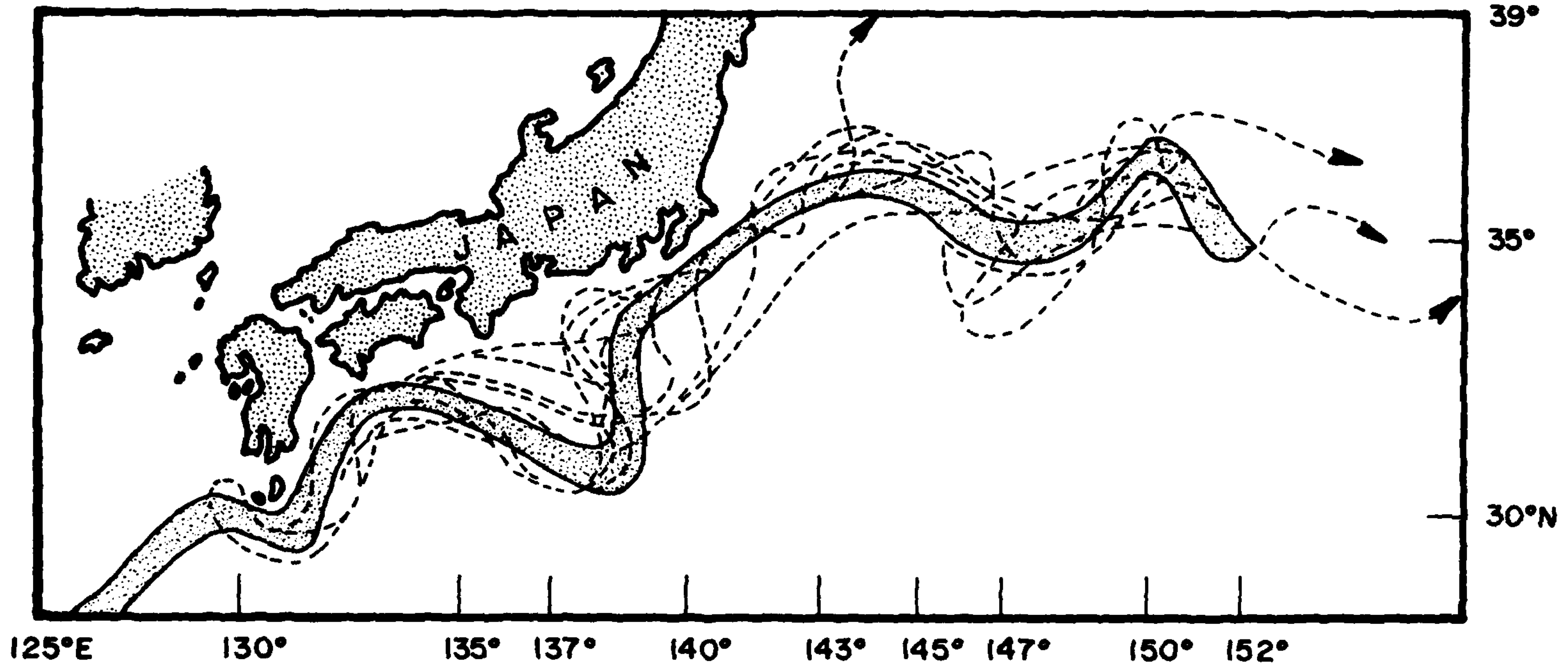


Figure 4.—Meandering pattern of the central axis of the Kuroshio Current during the years 1959-1963, (after Uda, 1964).

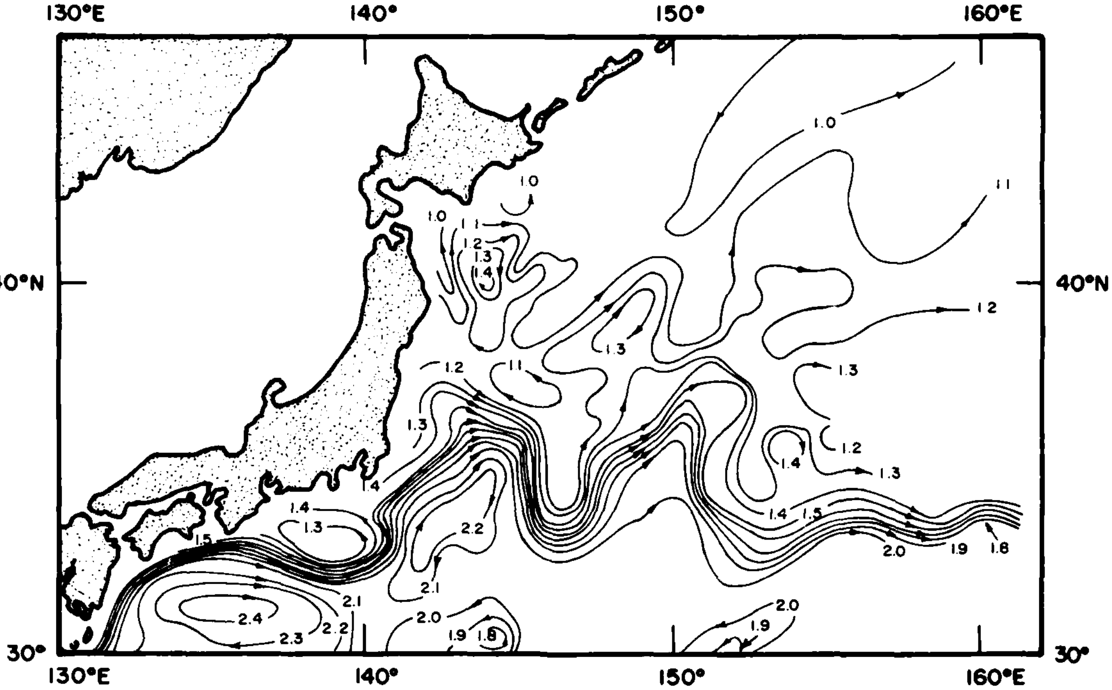


Figure 5.—The dynamic depth anomalies (dyn. m.) for the area of the Kuroshio and the Kuroshio Extension—Winter 1965-66 (after the Provisional CSK ATLAS, 1968).

0/1000 db for the Pacific

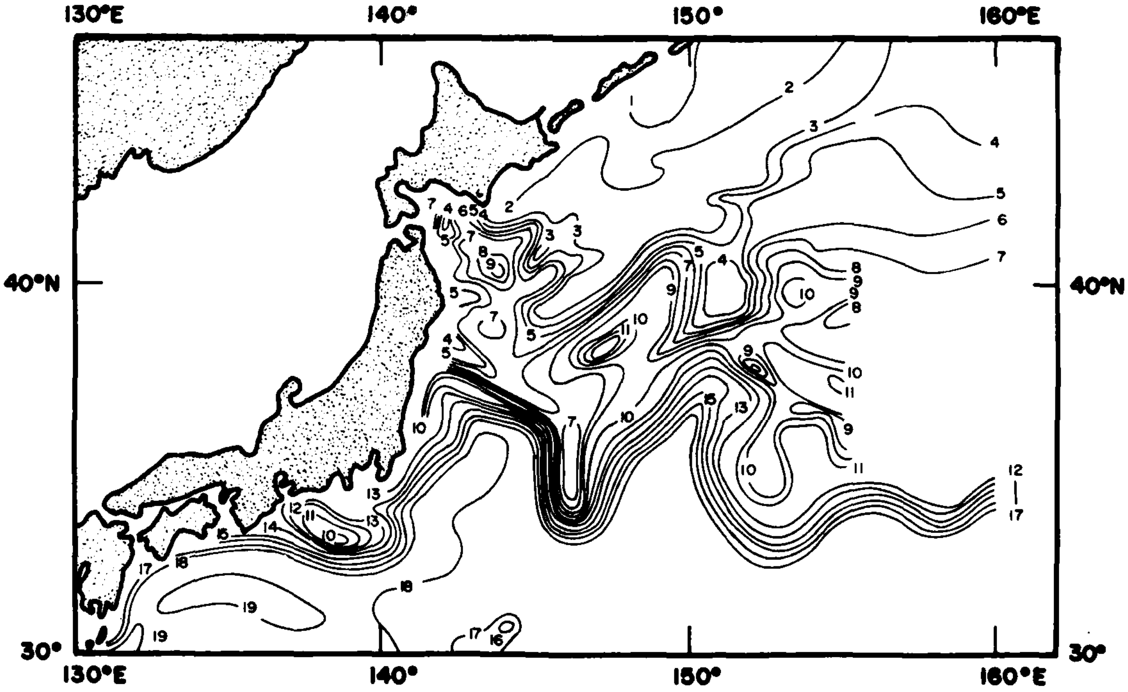


Figure 6.—The 200 meter temperature (°C) distribution for the area of the Kuroshio and the Kuroshio Extension—Winter 1965-66 (after the Provisional CSK ATLAS, 1968).

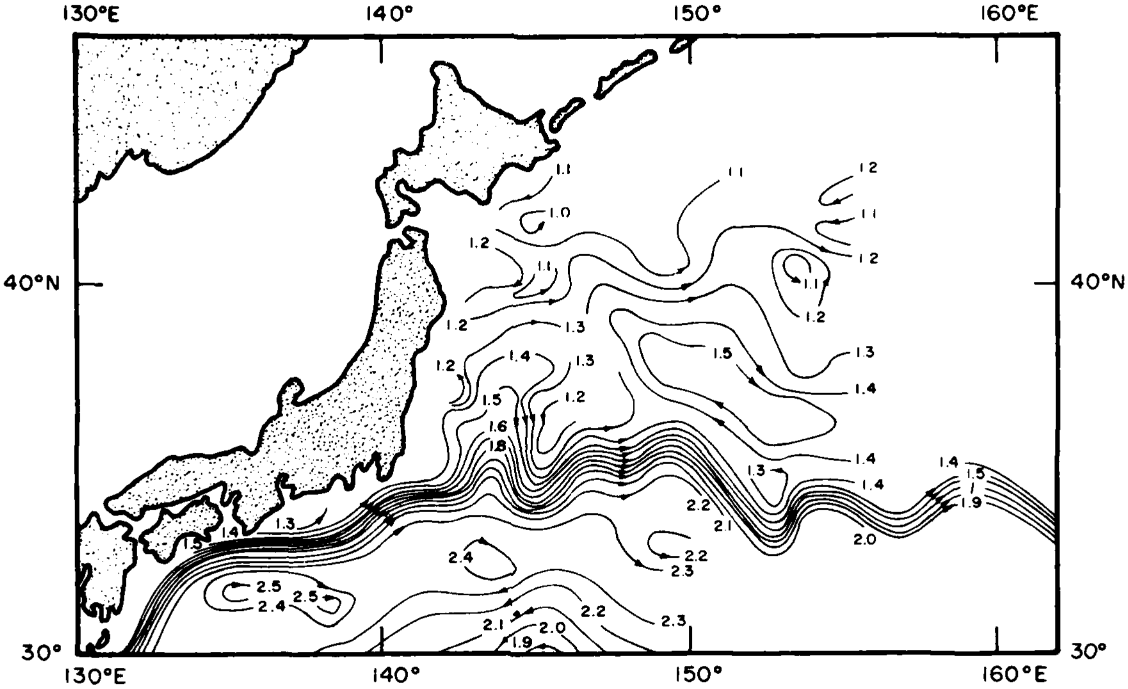


Figure 7.—The dynamic depth anomalies (dym. m.) for the area of the Kuroshio and the Kuroshio Extension—Summer 1966 (after CSK ATLAS, 1969).

0/1000 db for the Pacific

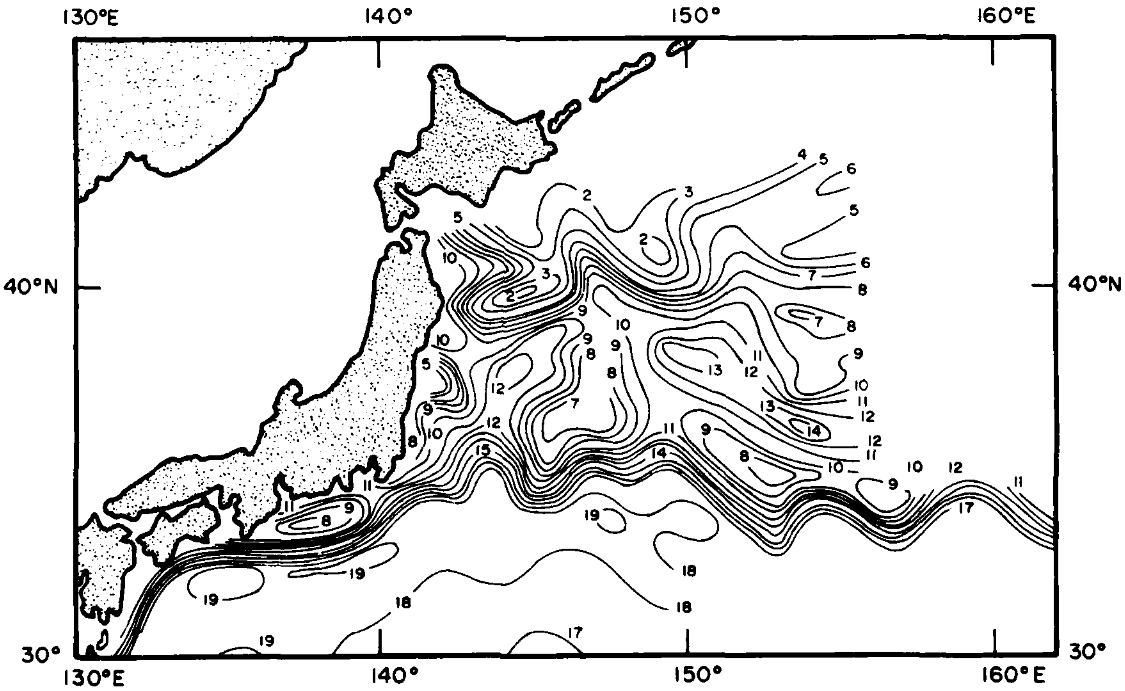


Figure 8.—The 200 meter temperature (°C) distribution for the area of the Kuroshio and the Kuroshio Extension-Summer 1966 (after CSK ATLAS, 1969).

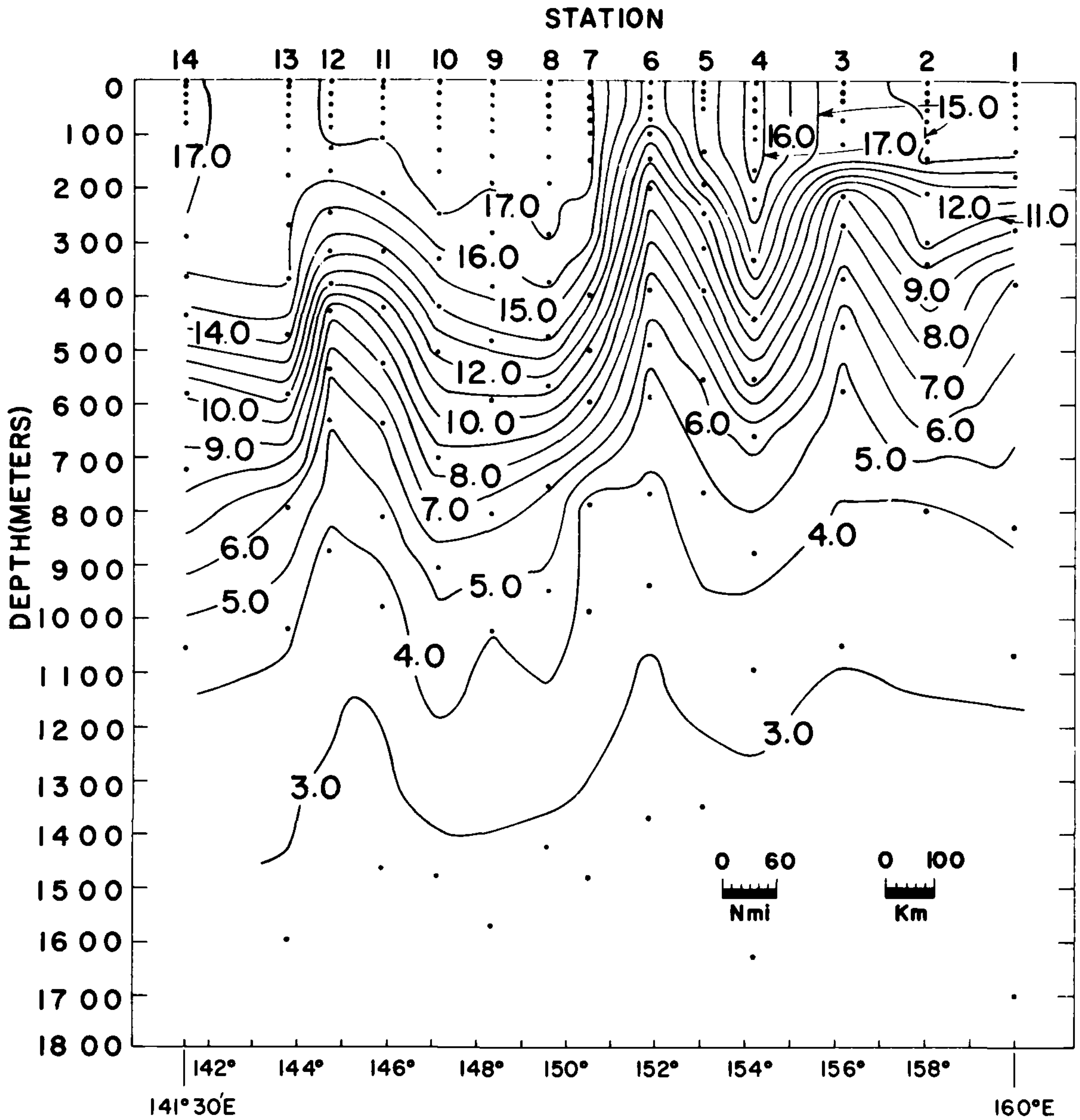


Figure 9.—Profile of temperature (°C) for the occupation of P1-6, USCGC BERING STRAIT, 28 February to 4 March 1969.

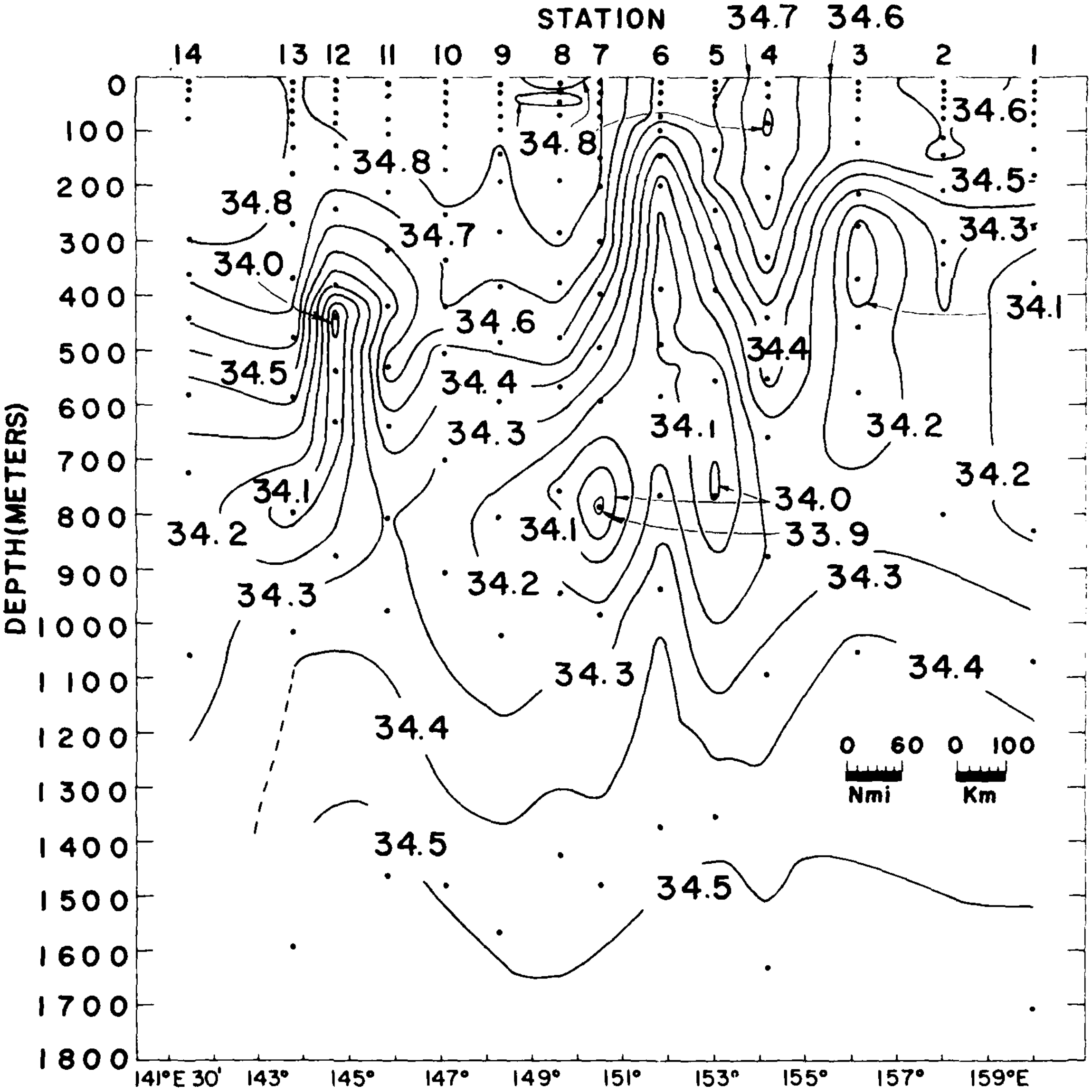


Figure 10.—Profile of salinity (°/₀₀) for occupation of P1-6, USCGC BERING STRAIT, 28 February to 4 March 1969.

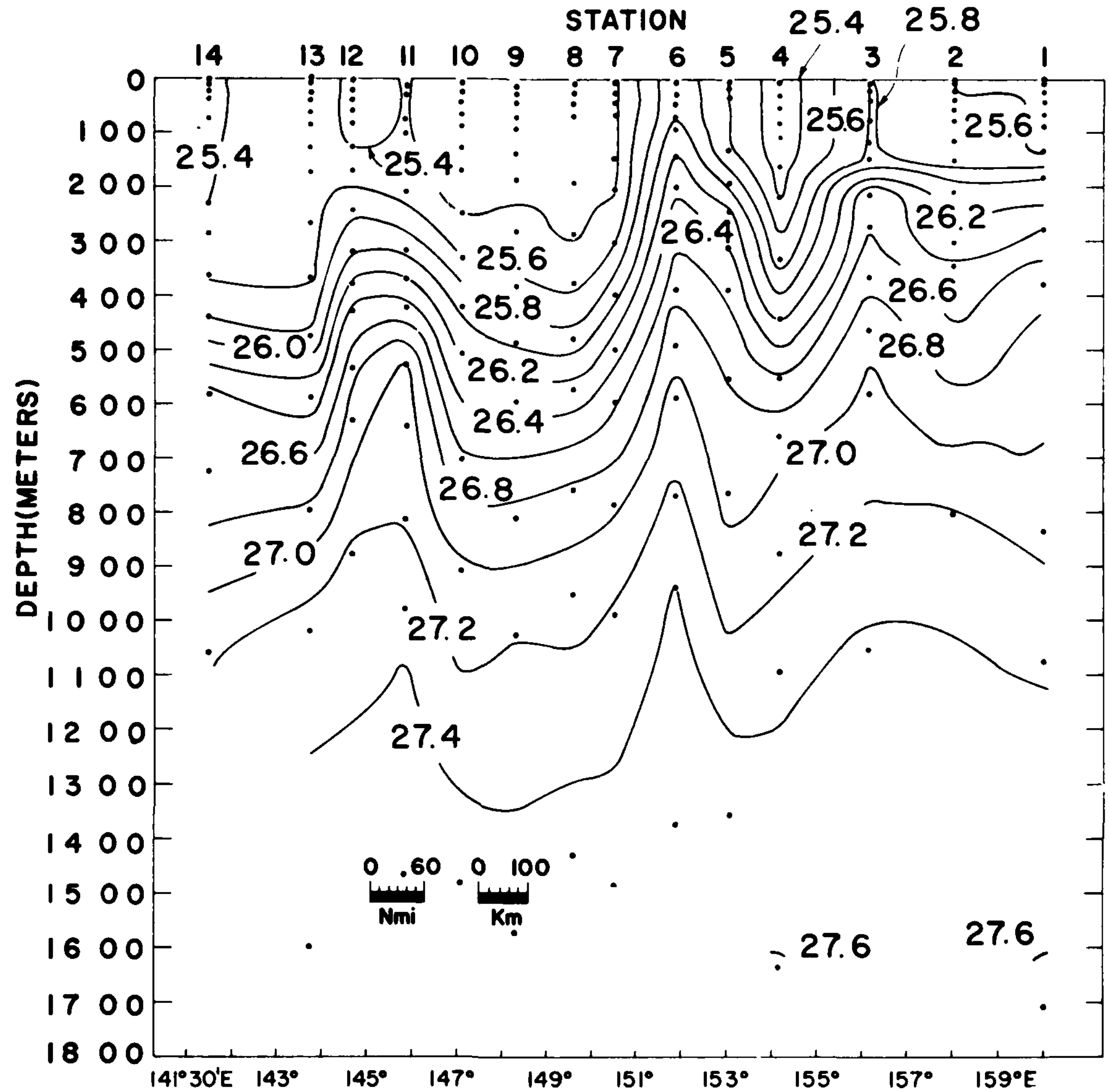


Figure 11.—Profile of sigma-t (g cm $^{-3}$) for occupation of P1-6, USCGC BERING STRAIT; 28 February to 4 March 1969.

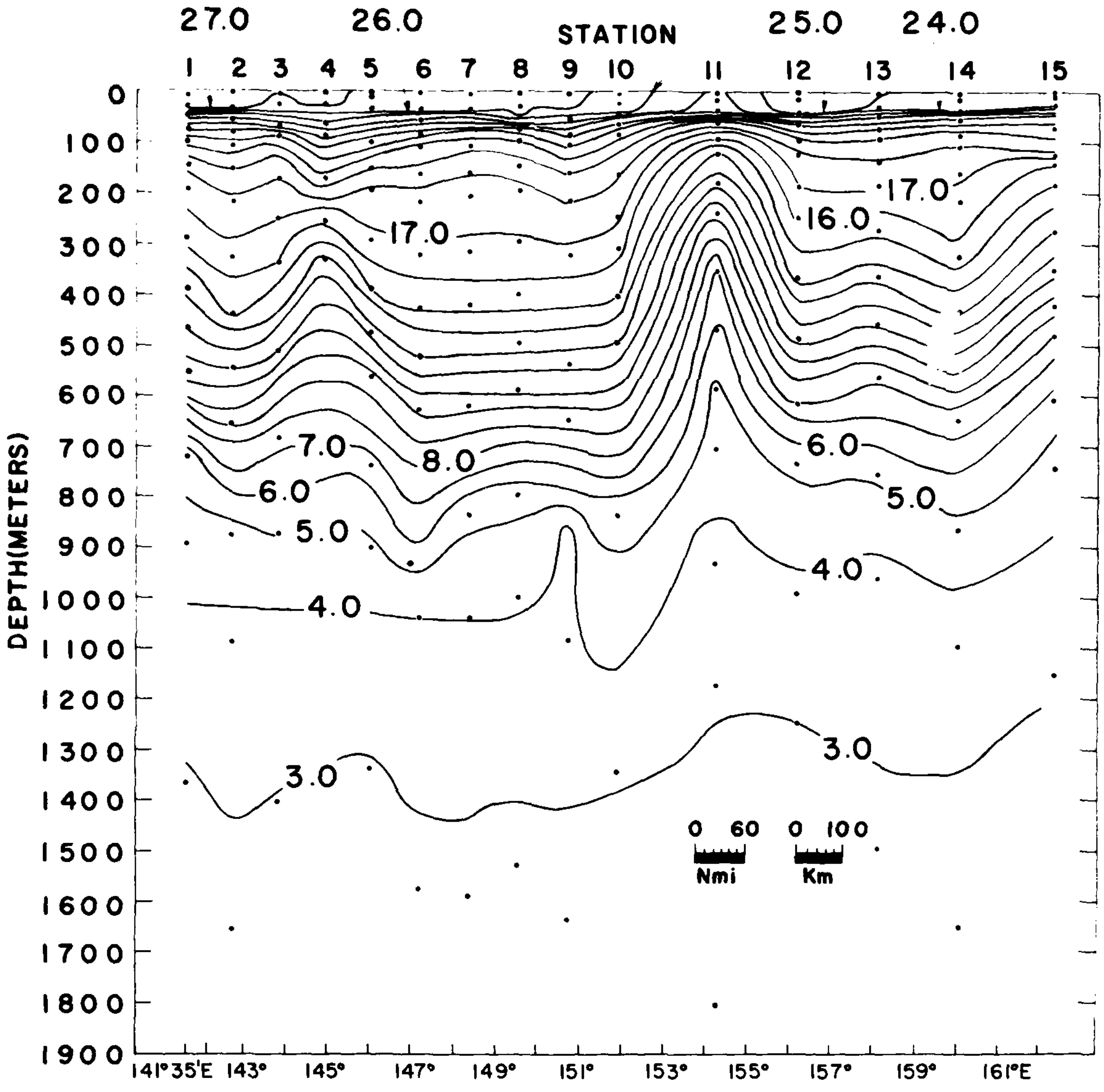


Figure 12.—Profile of temperature (°C) for occupation of P1-8, USCGC CHAUTAUQUA, 22-26 September 1969.

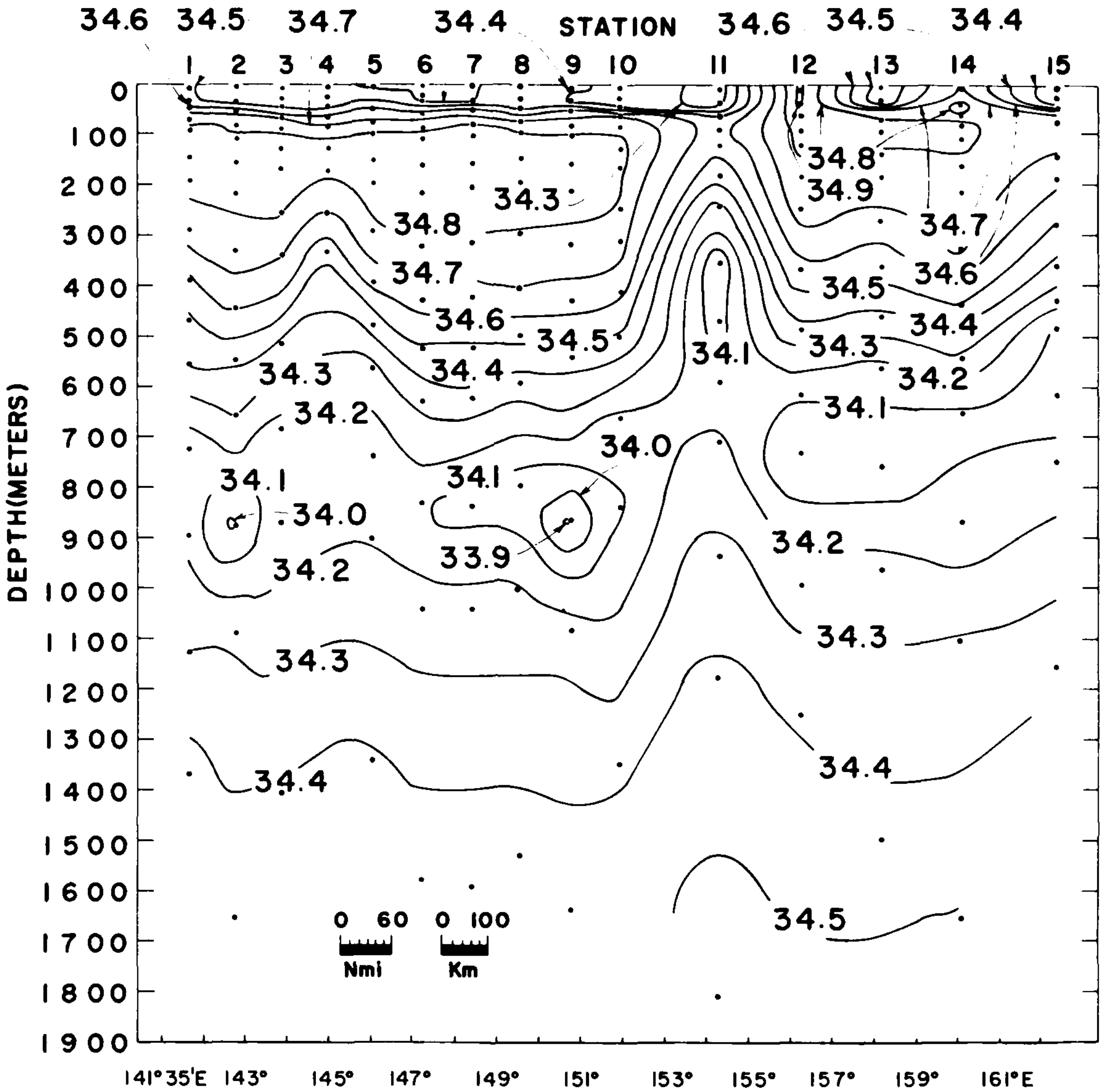


Figure 13.—Profile of salinity (°/₀₀) for occupation of P1-8, USCGC CHAUTAUQUA, 22-26 September 1969.

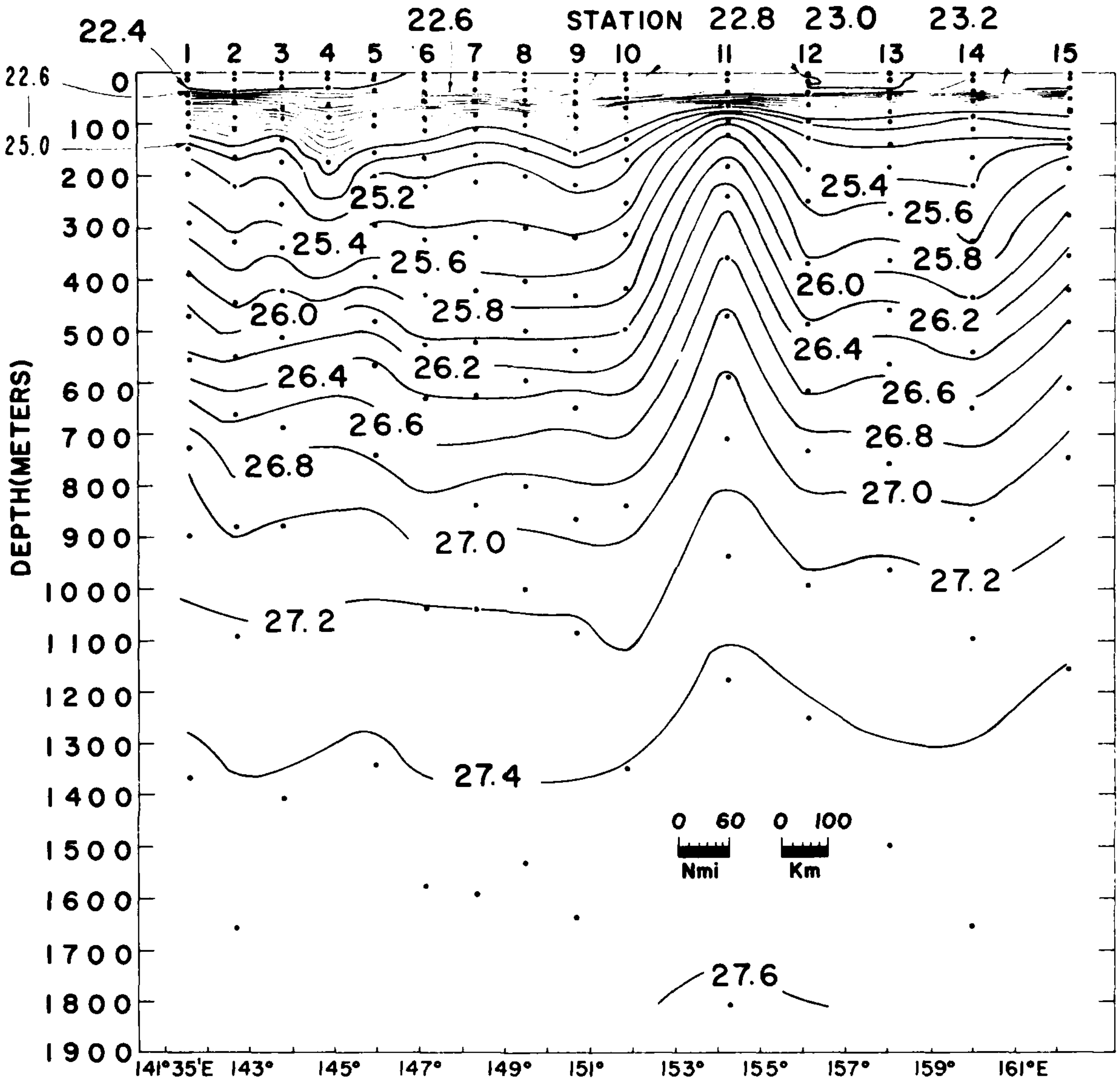


Figure 14.—Profile of sigma-t (g cm[-3]) for occupation of P1-8, USCGC CHAUTAUQUA, 22-26 September 1969.

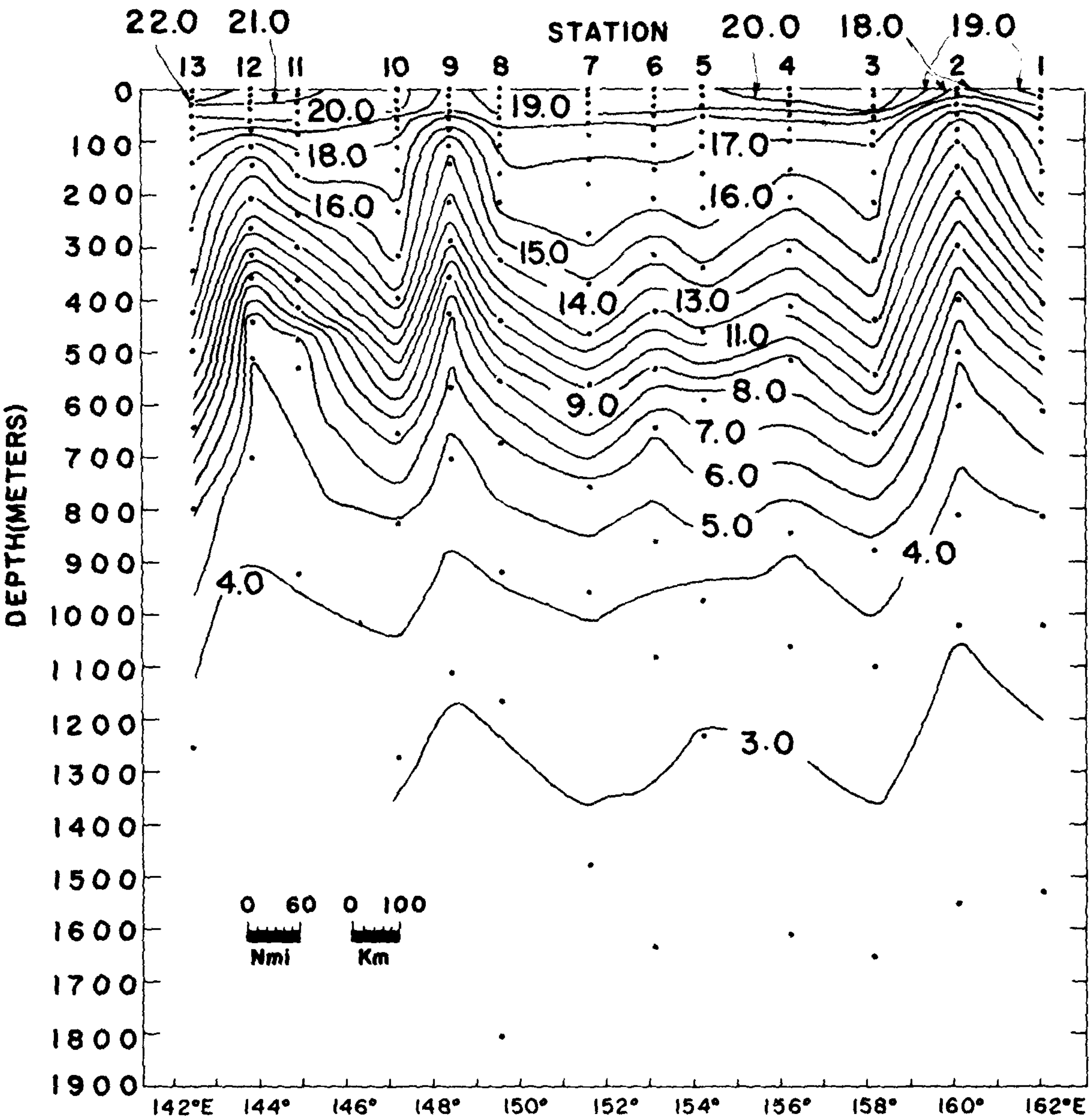


Figure 15.—Profile of temperature (°C) for occupation of P1-11, USCGC MINNETONKA, 6-9 June 1970.

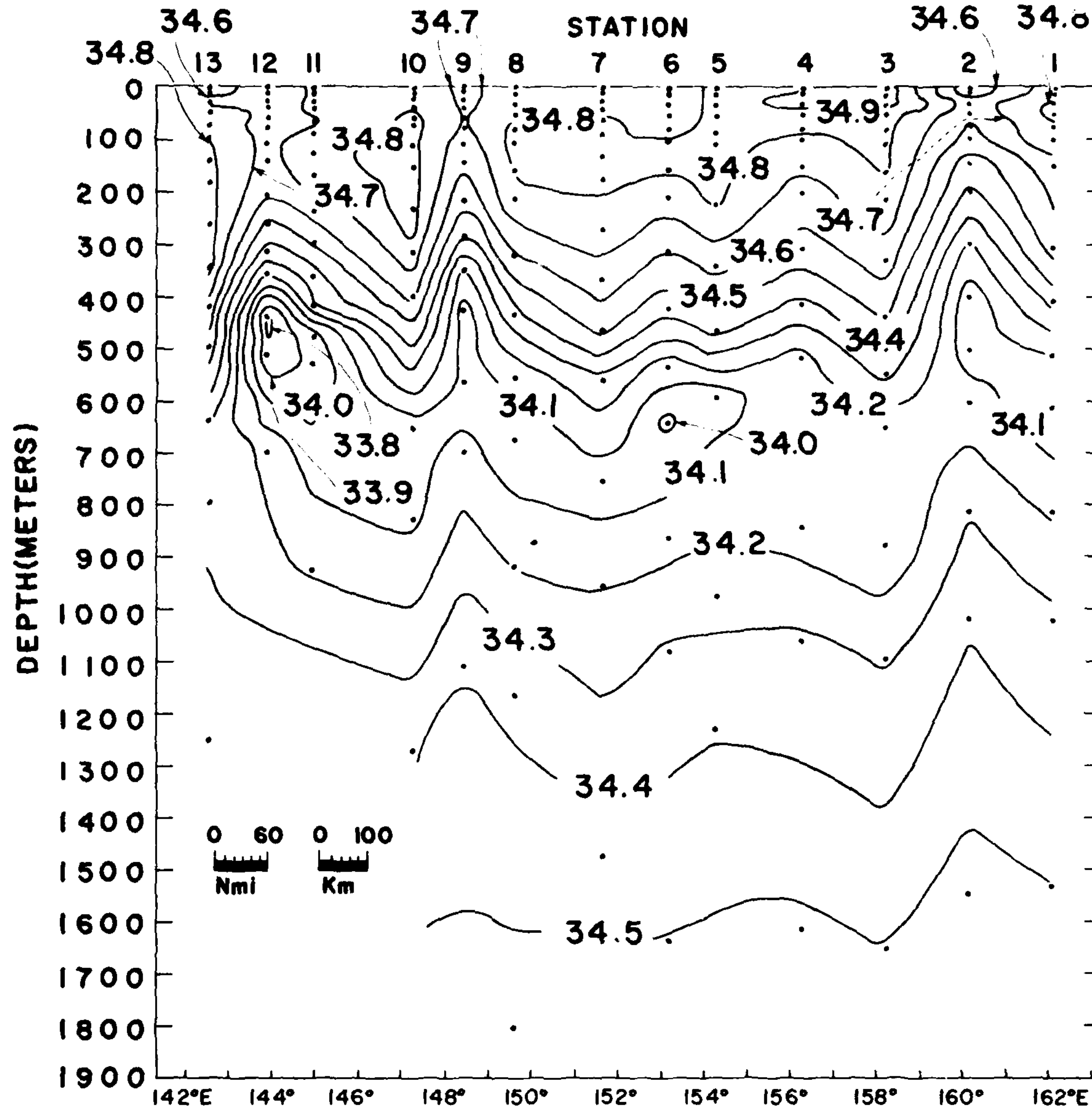


Figure 16.—Profile of salinity (°/₀₀) for occupation of P1-11, USCGC MINNETONKA, 6-9 June 1970.

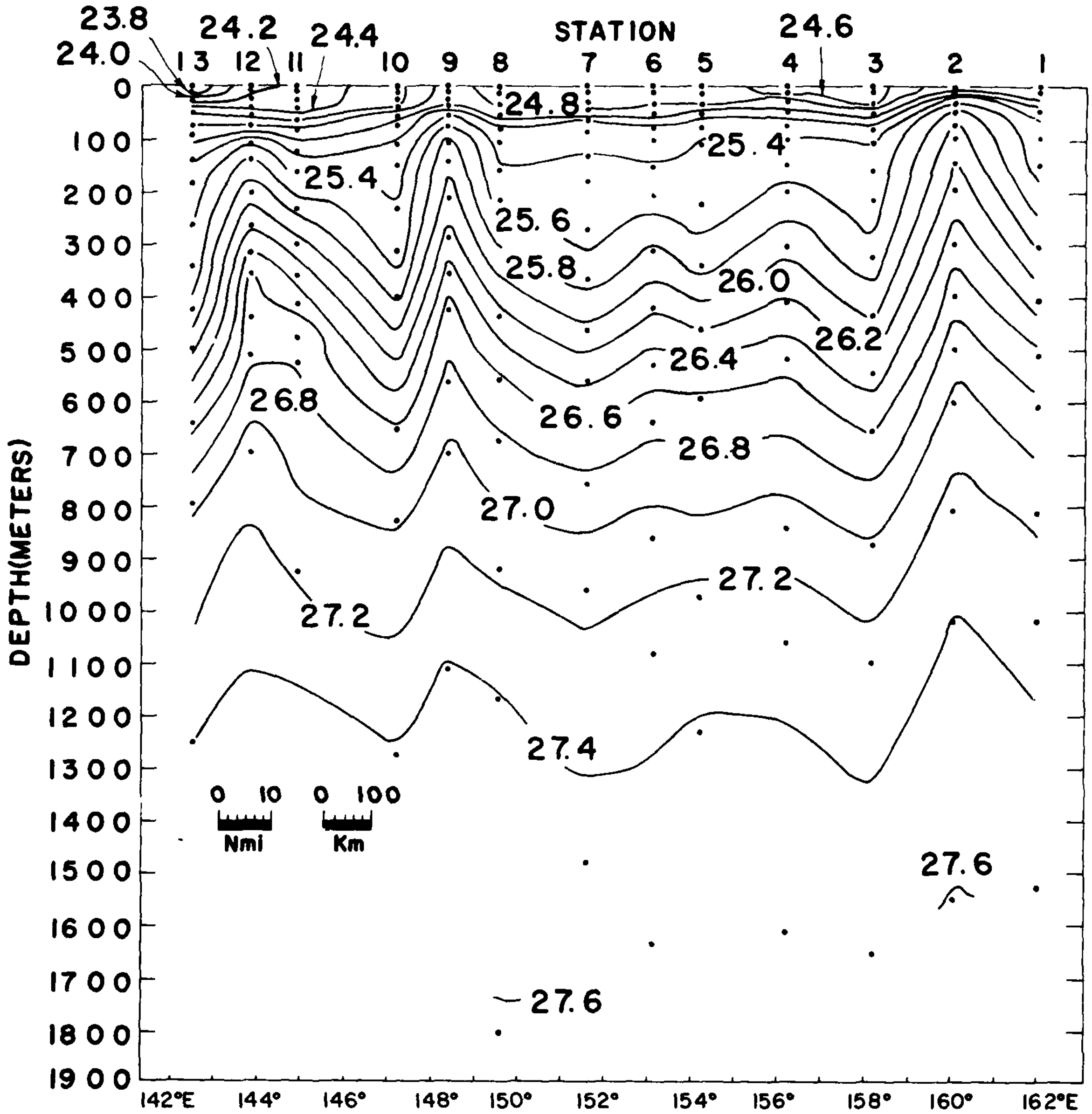


Figure 17.—Profile of sigma-t (g cm^{-3}) for occupation of P1-11, USCGC MINNETONKA, 6-9 June 1970.

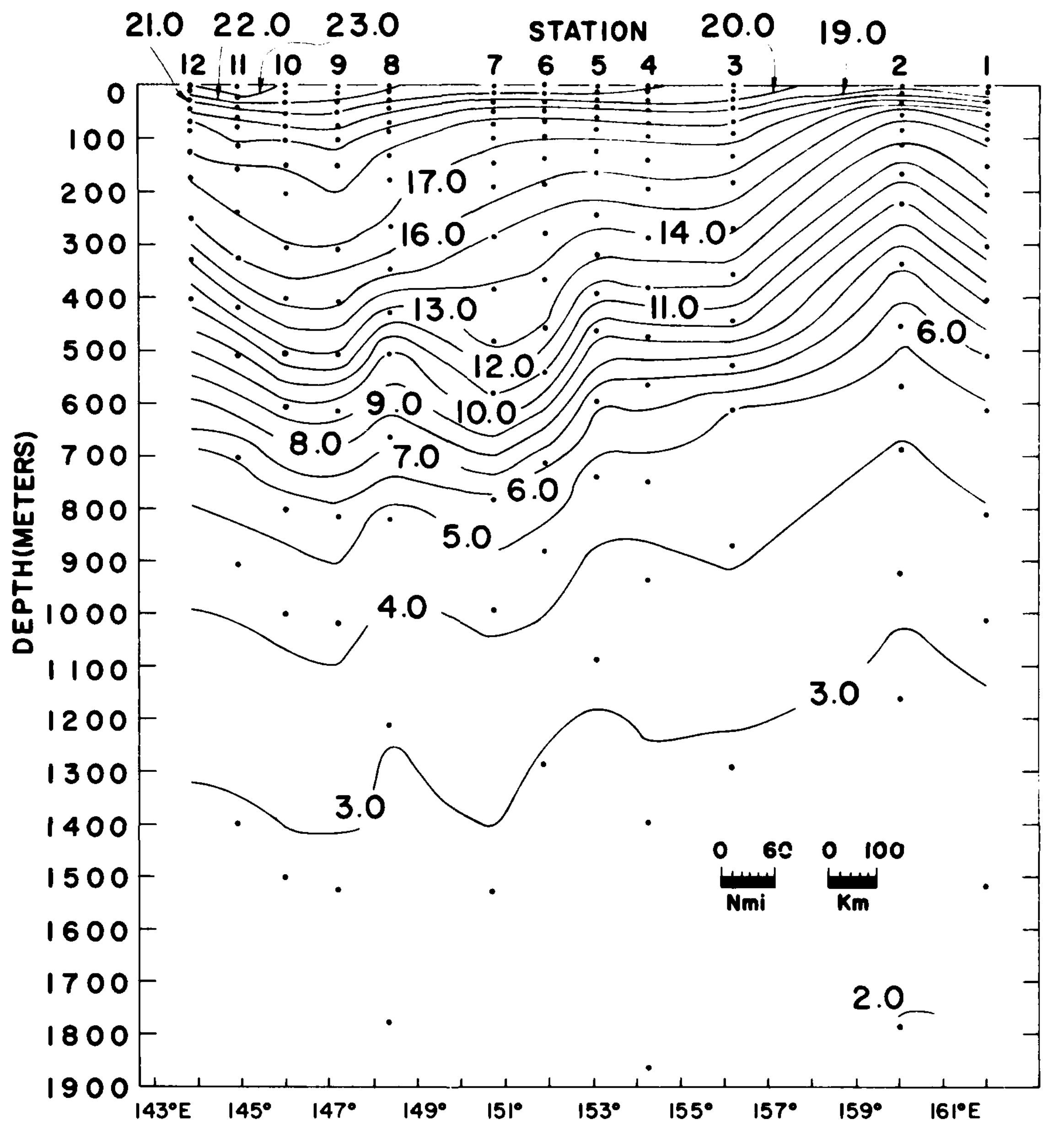


Figure 18.—Profile of temperature (°C) for occupation of P1-12, USCGC WACHUSETT, 26-30 June 1970.

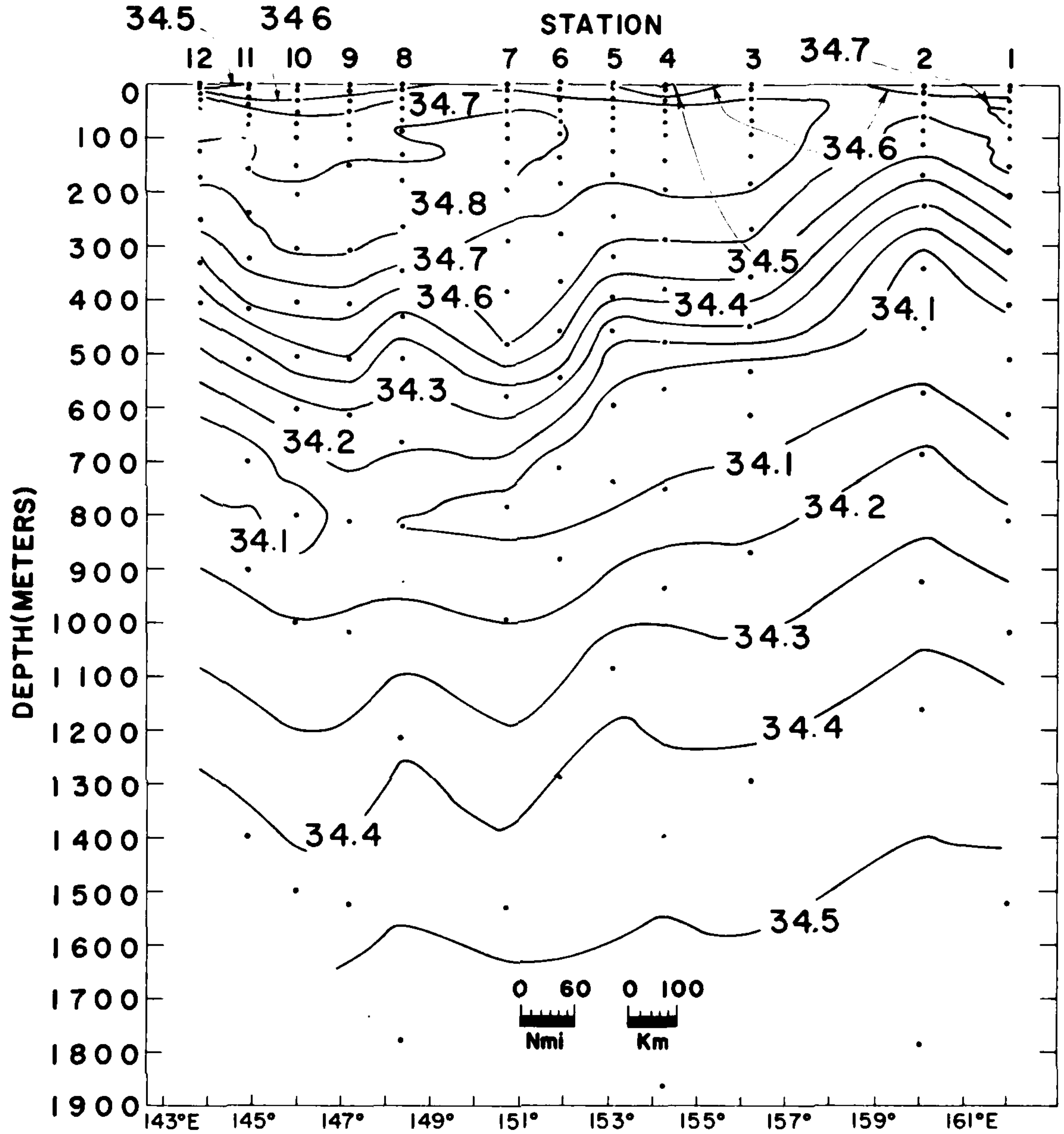


Figure 19.—Profile of salinity (°/₀₀) for occupation of P1-12, USCGC WACHUSETT, 26-30 June 1970.

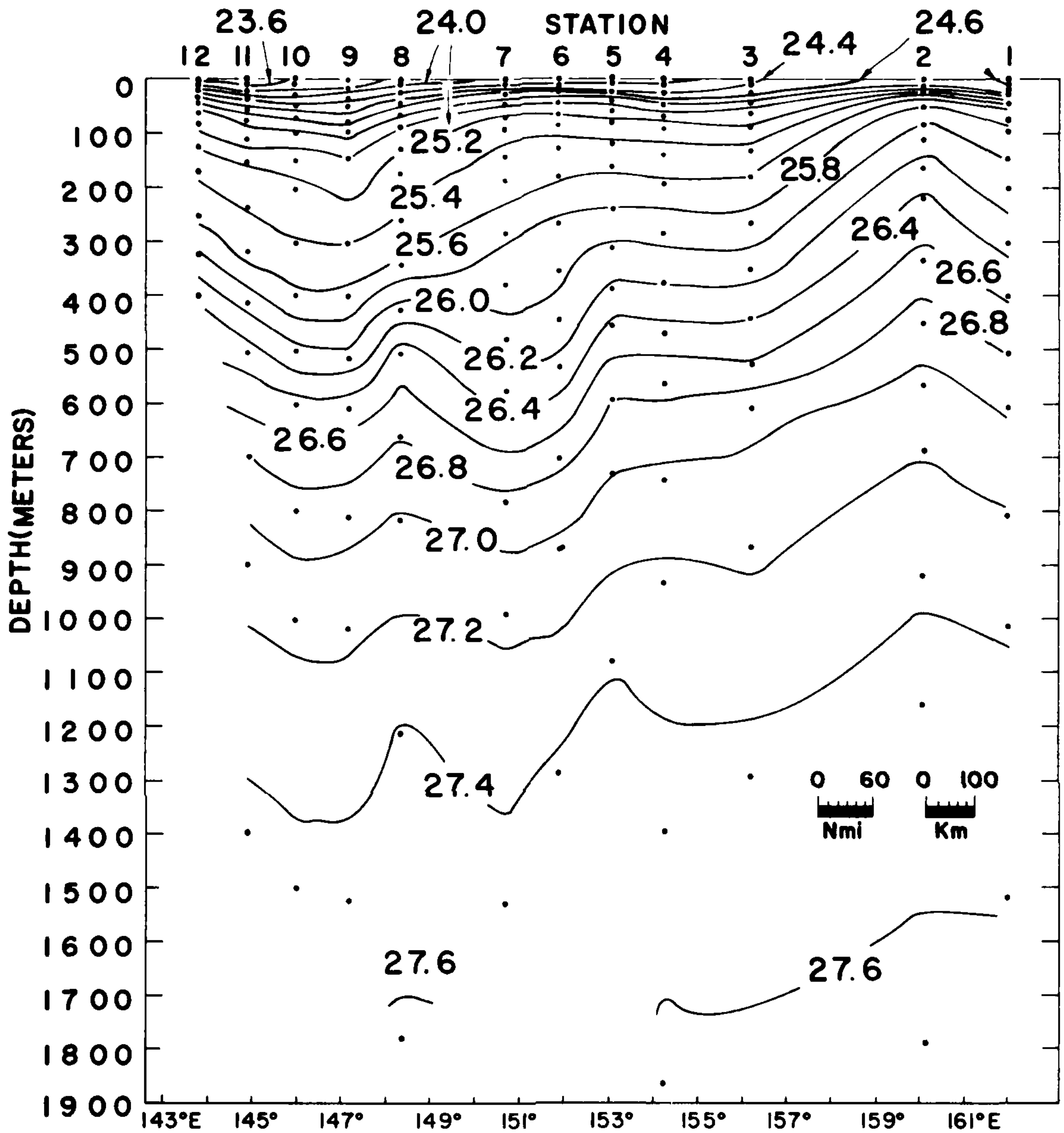


Figure 20.—Profile of sigma-t (g cm^{-3}) for occupation of P1-12, USCGC WACHUSETT, 26-30 June 1970.

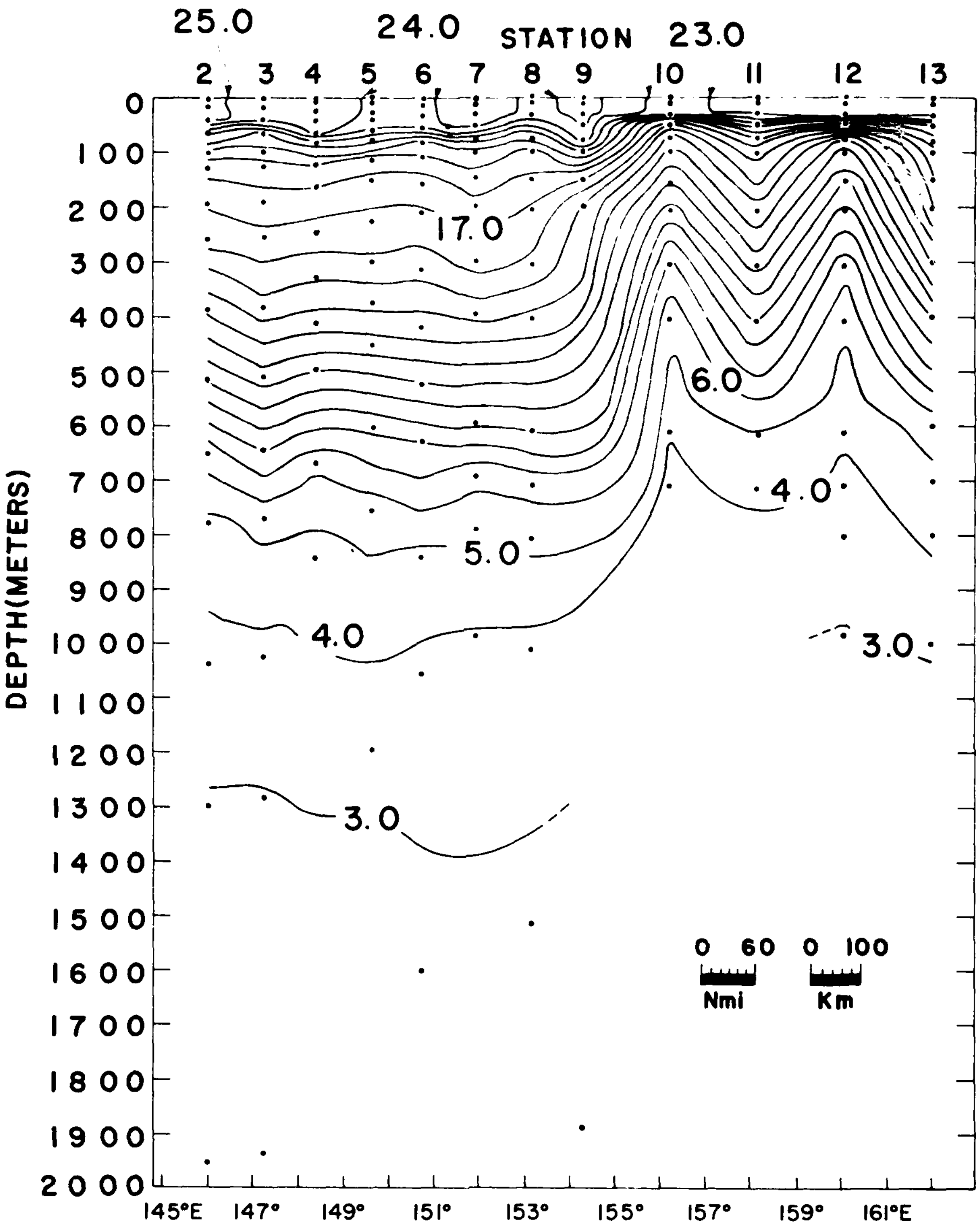


Figure 21.—Profile of temperature (°C) for occupation of P1-13, USCGC WINNEBAGO, 5-10 October 1970. (Station 1 omitted. Station spacing was too large to draw meaningful contours.)

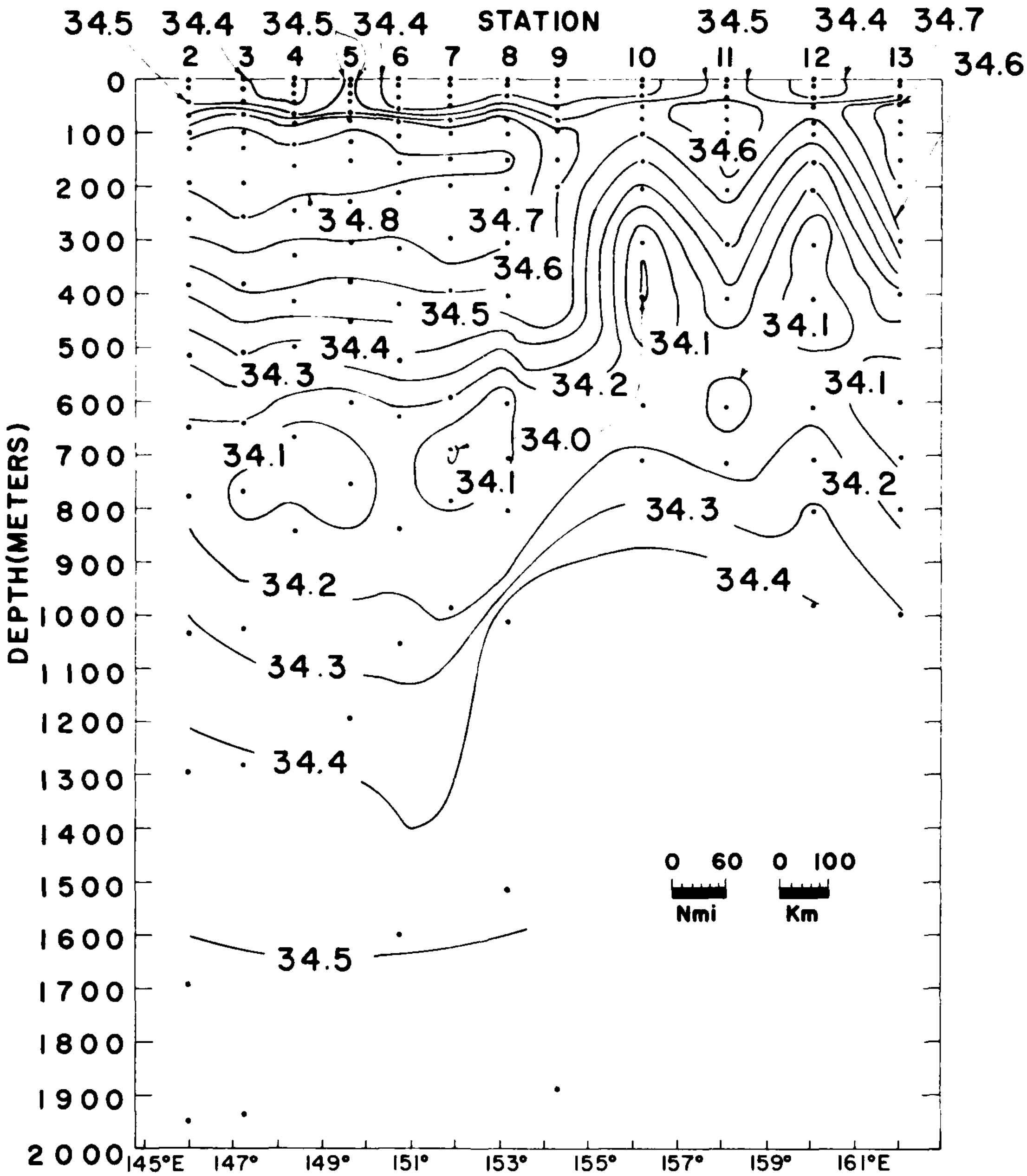


Figure 22.—Profile of salinity (°/₀₀) for occupation of P1-13, USCGC WINNEBAGO, 5-10 October 1970. (Station 1 ommitted. Station spacing was too large to draw meaningful contours.)

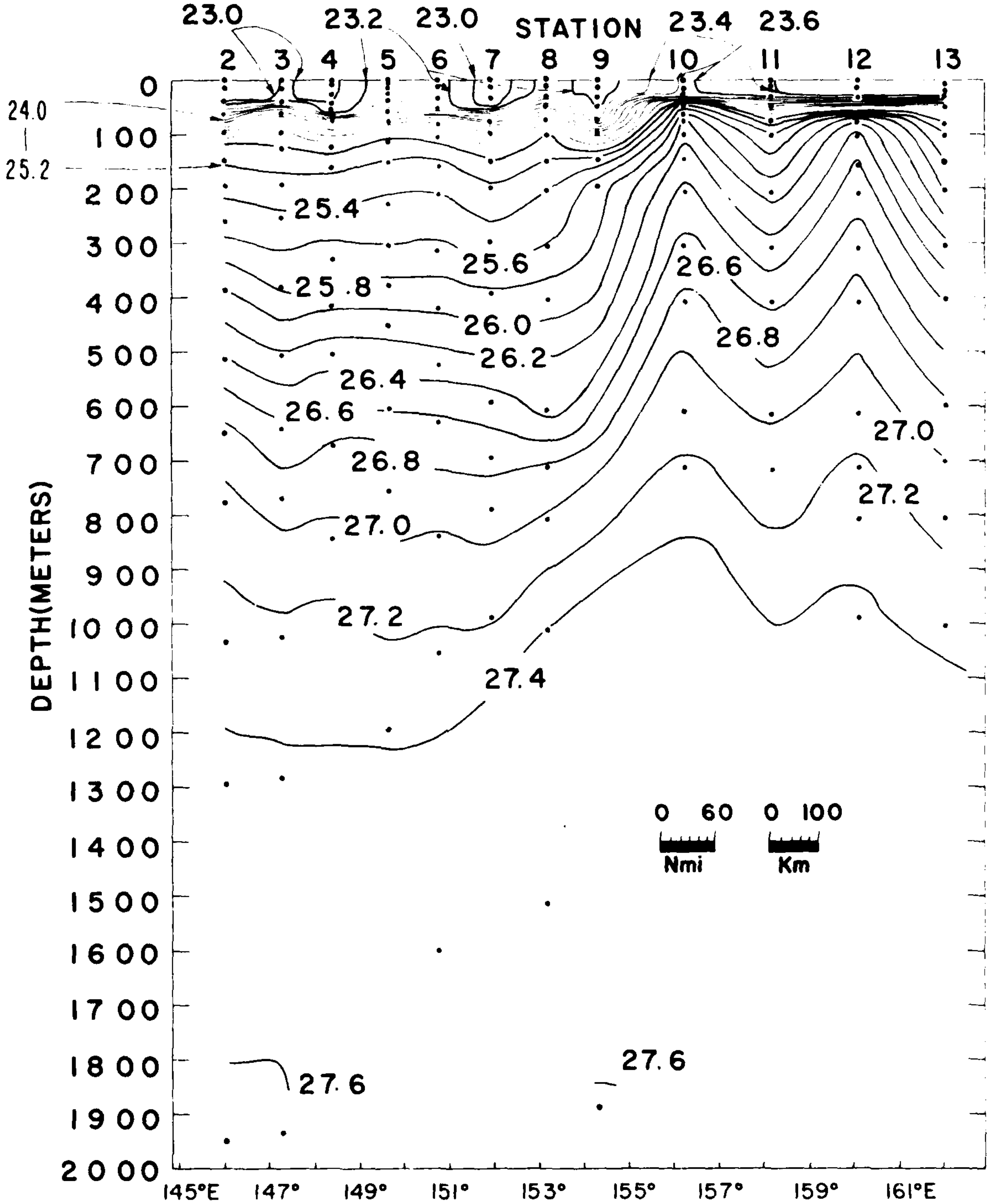


Figure 23. *Profile of sigma-t (g cm^{-3}) for occupation of P1-13,* **USCGC WINNEBAGO, 5-10 October 1970. (Station 1 omitted. Station spacing was too large to draw meaningful contours.)**

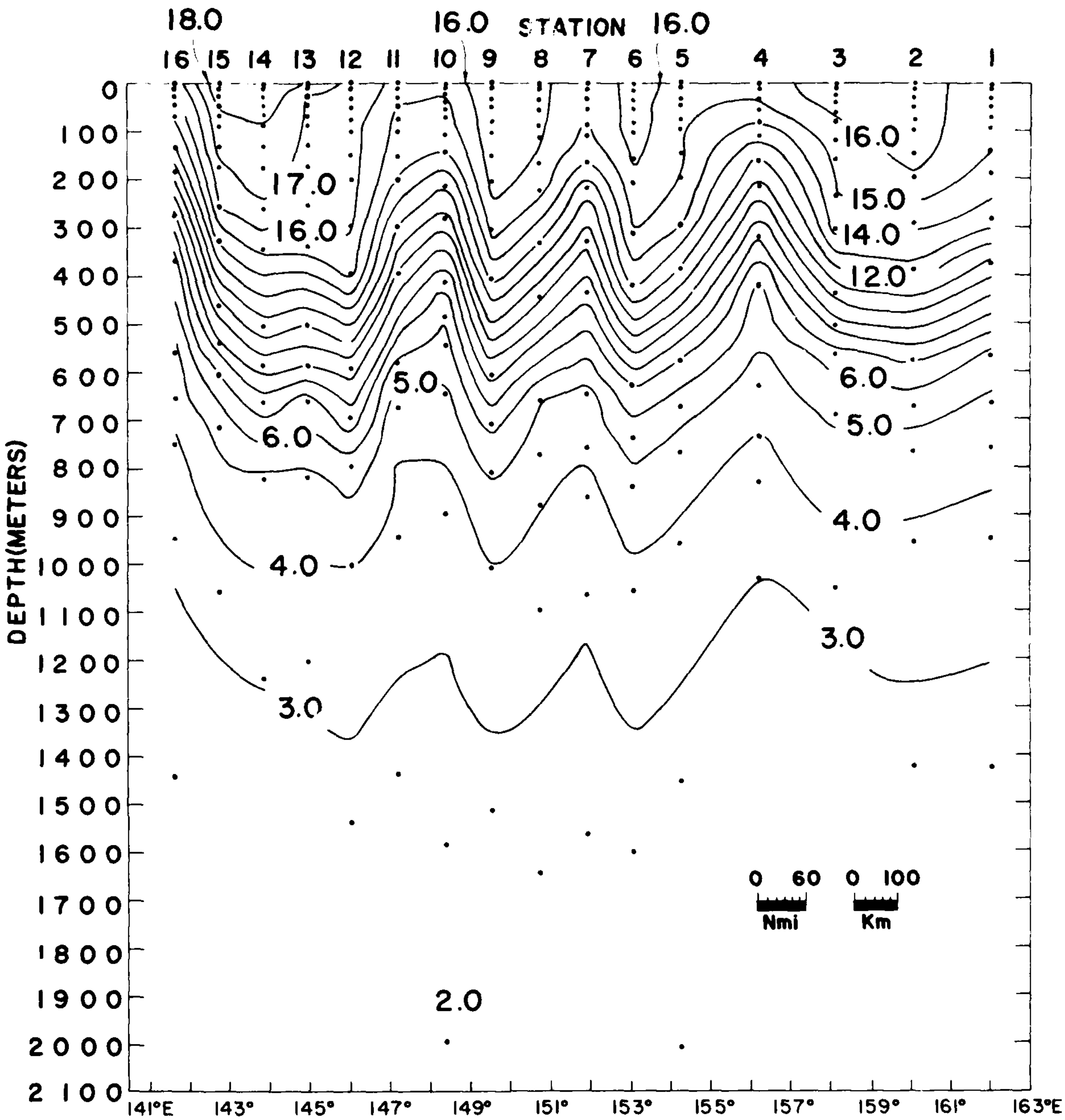


Figure 24. Profile of temperature (°C) for occupation of P1-15, USCGC MINNETONKA, 27-30 March 1971.

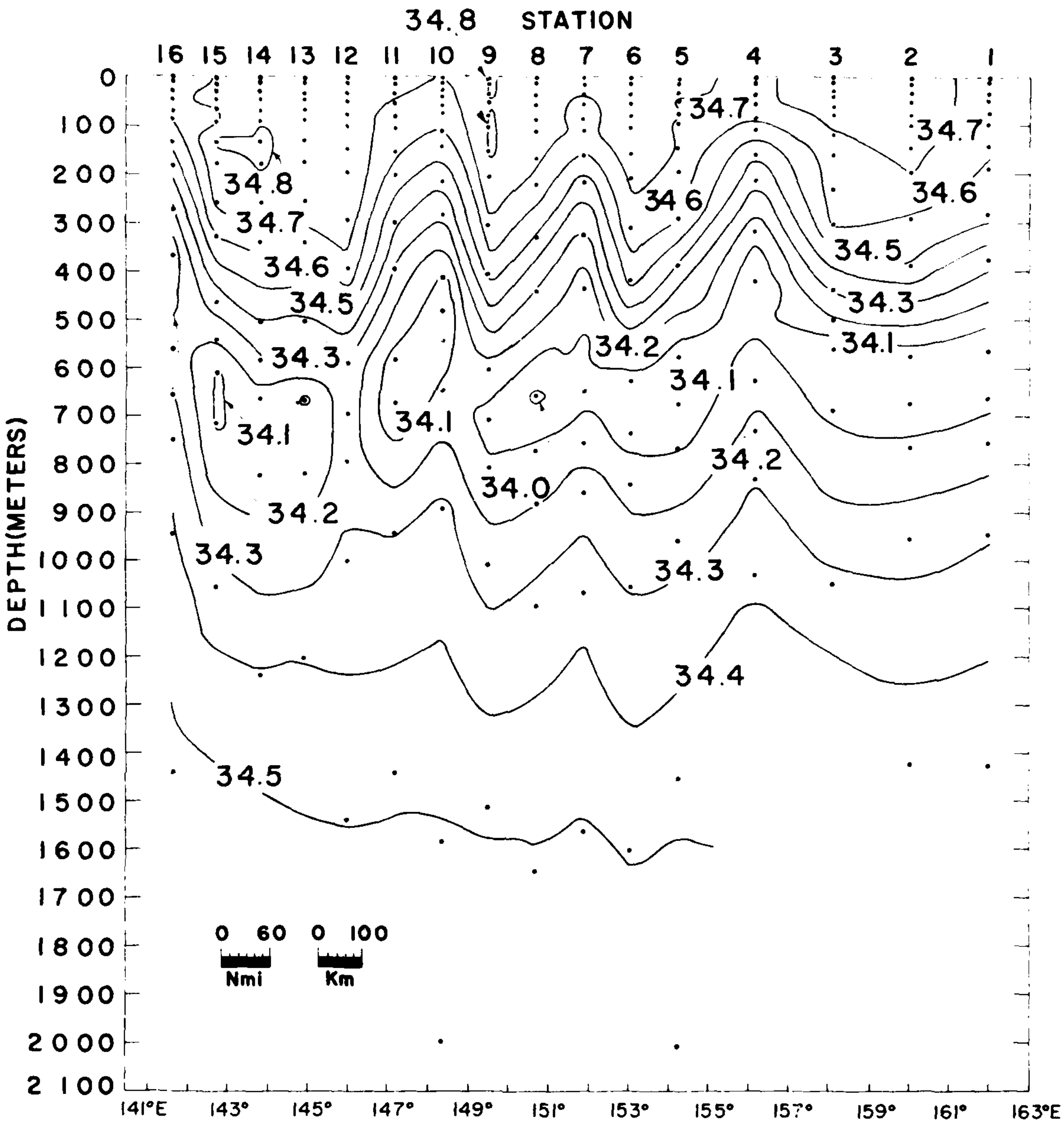


Figure 25.—Profile of salinity (°/₀₀) for occupation of P1-15, USCGC MINNETONKA, 27-30 March 1971.

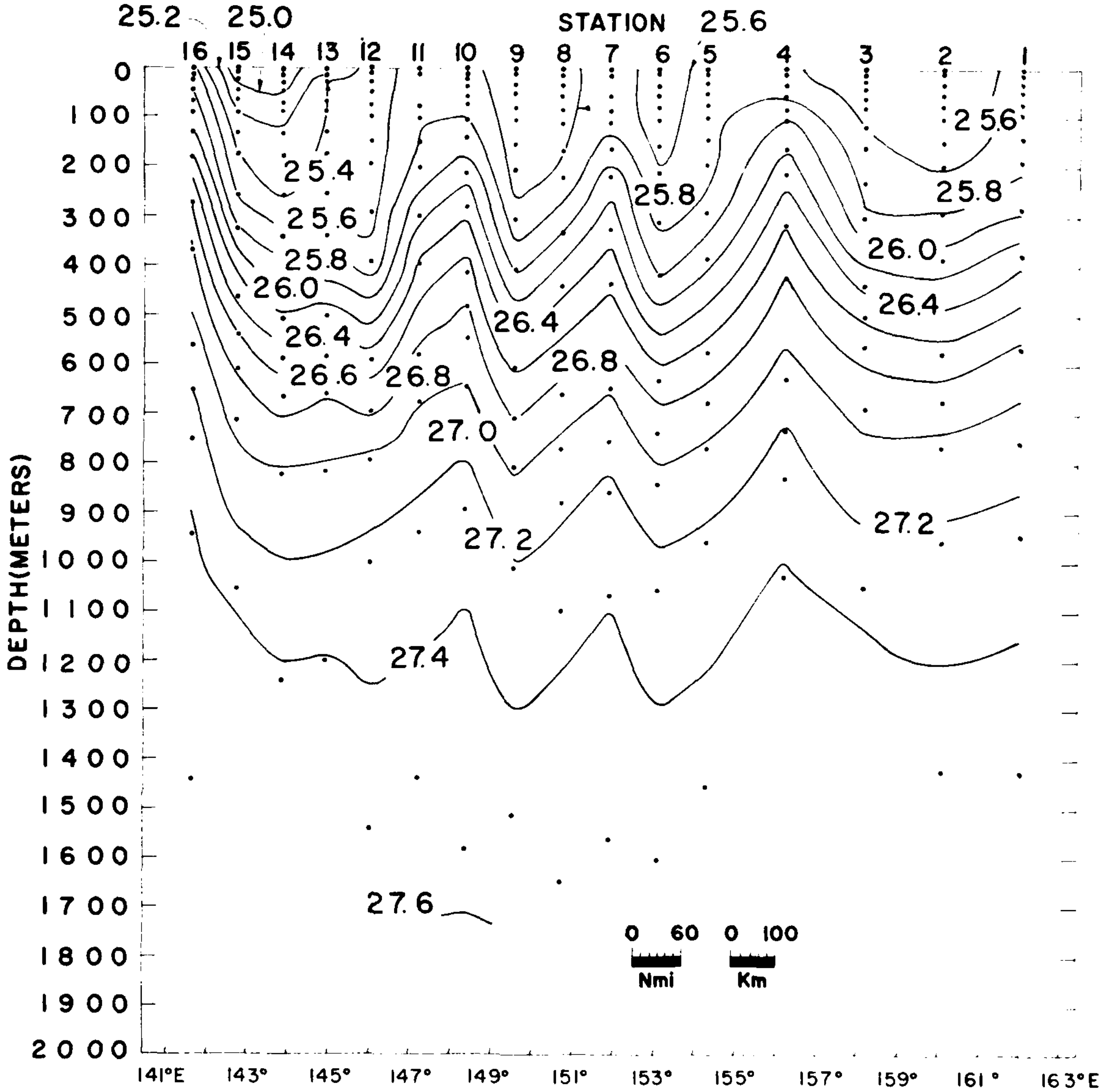


Figure 26.—Profile of sigma-t (g cm^{-3}) for occupation of P1-15, USCGC MINNETONKA, 27-30 March 1971.

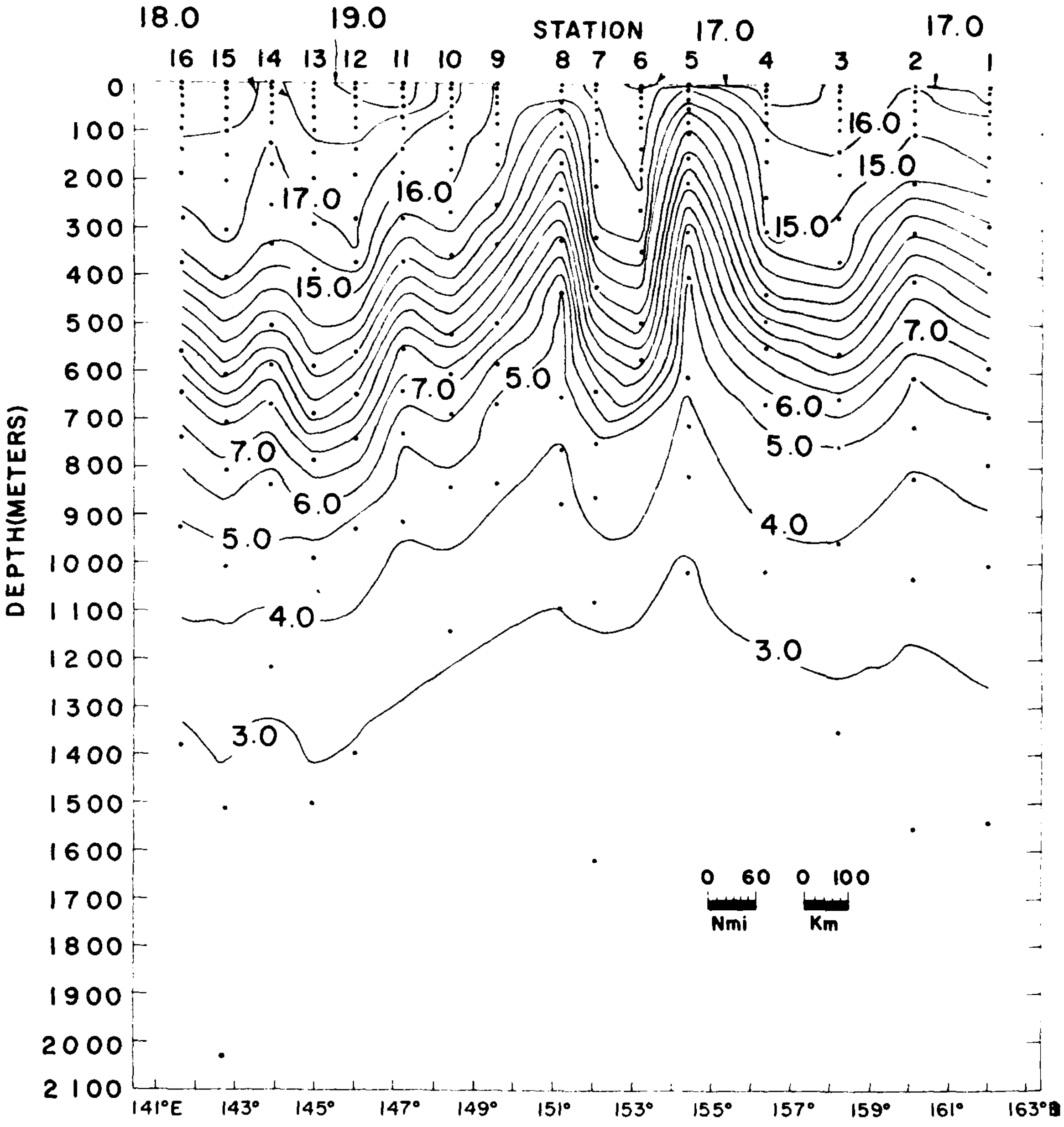


Figure 27.—Profile of temperature (°C) for occupation of P1-16, USCGC TANEY, 16-21 April 1971.

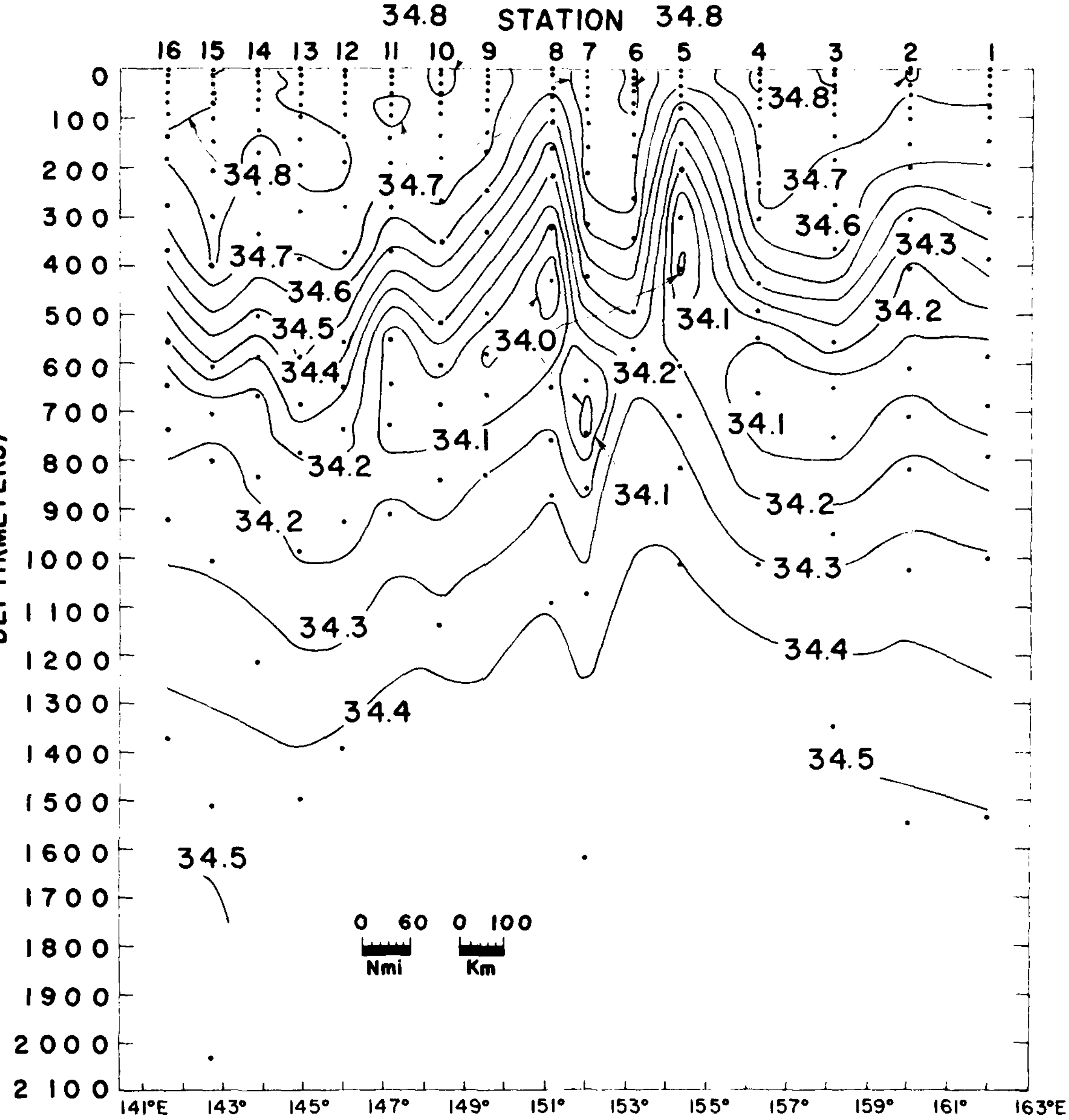


Figure 28.—Profile of salinity (°/₀₀) for occupation of P1-16, USCGC TANEY, 16-21 April 1971.

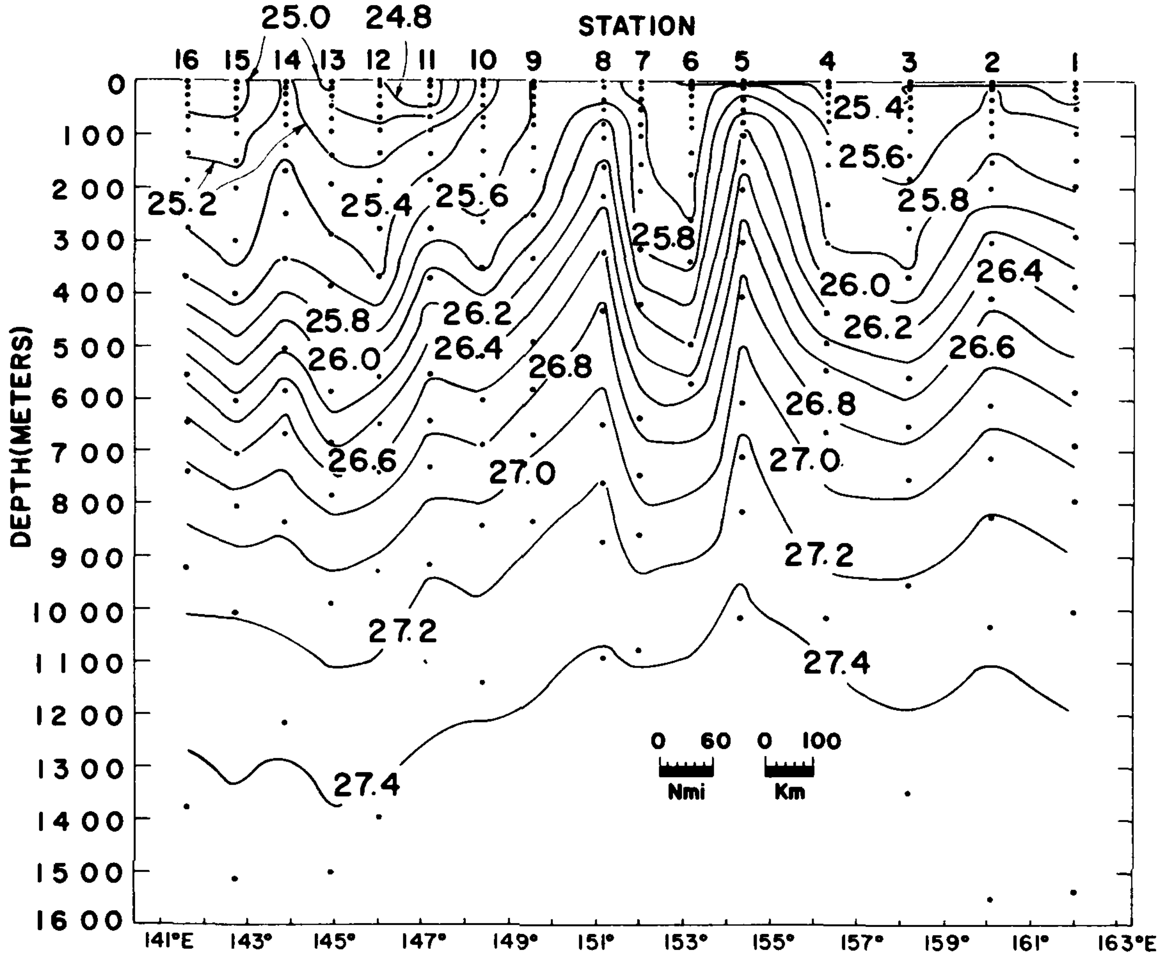


Figure 29.—Profile of sigma-t (g cm^{-3}) for occupation of P1-16, USCGC TANEY, 16-21 April 1971.

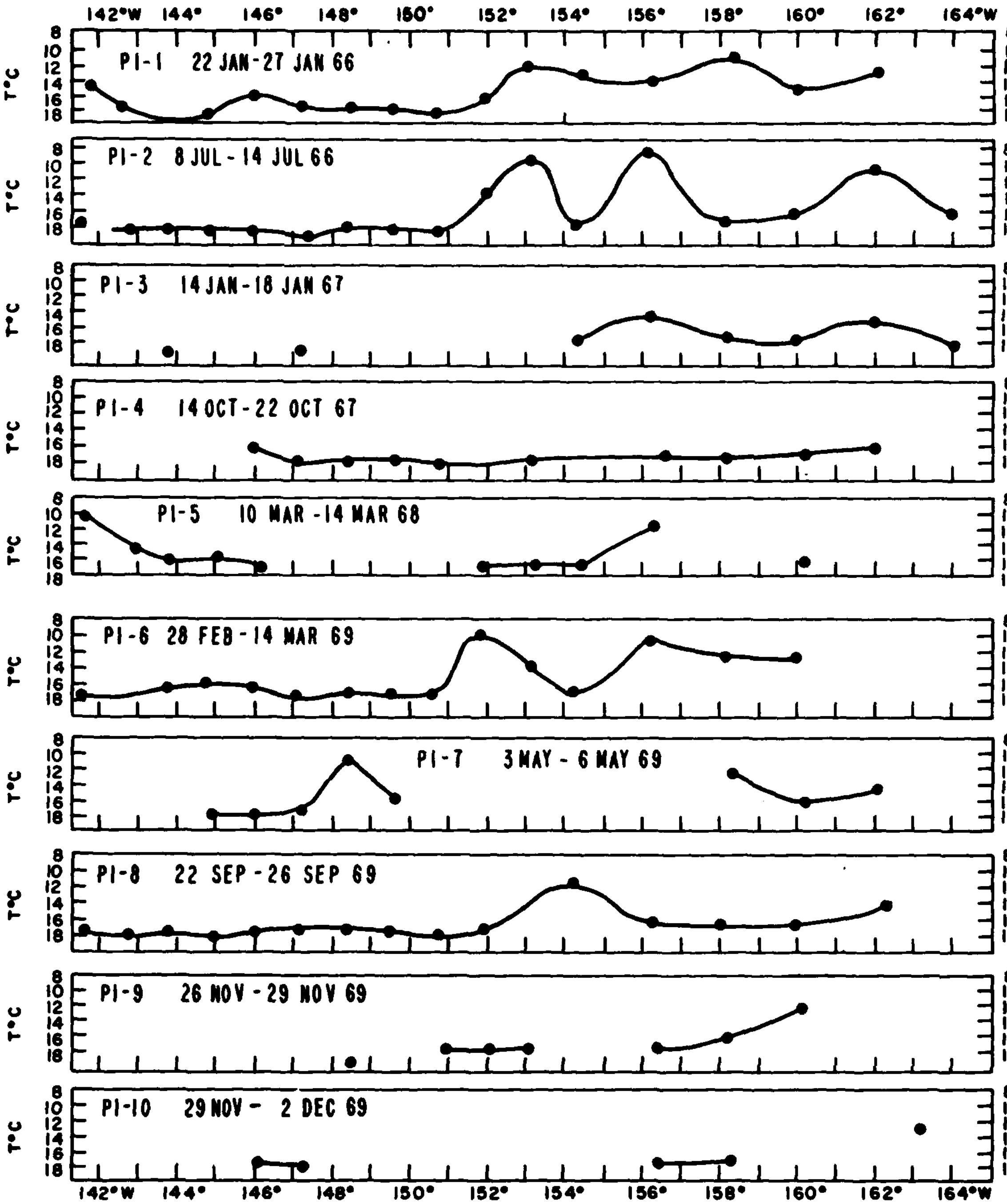


Figure 30.—The temperature (°C) of the 200 meter level for all occupations of Coast Guard Standard Section P1, 1966 to 1971.

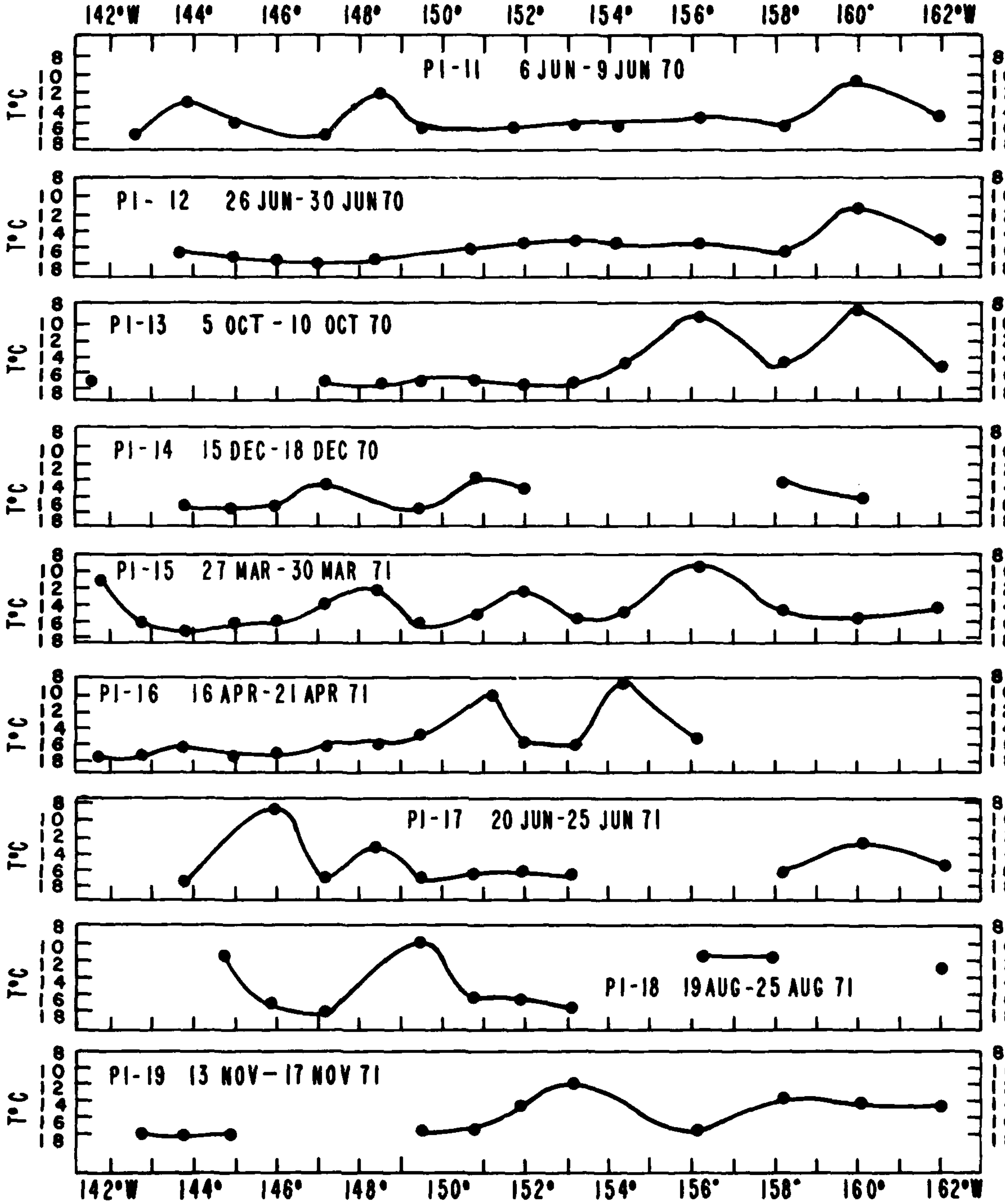


Figure 30.—Continued.

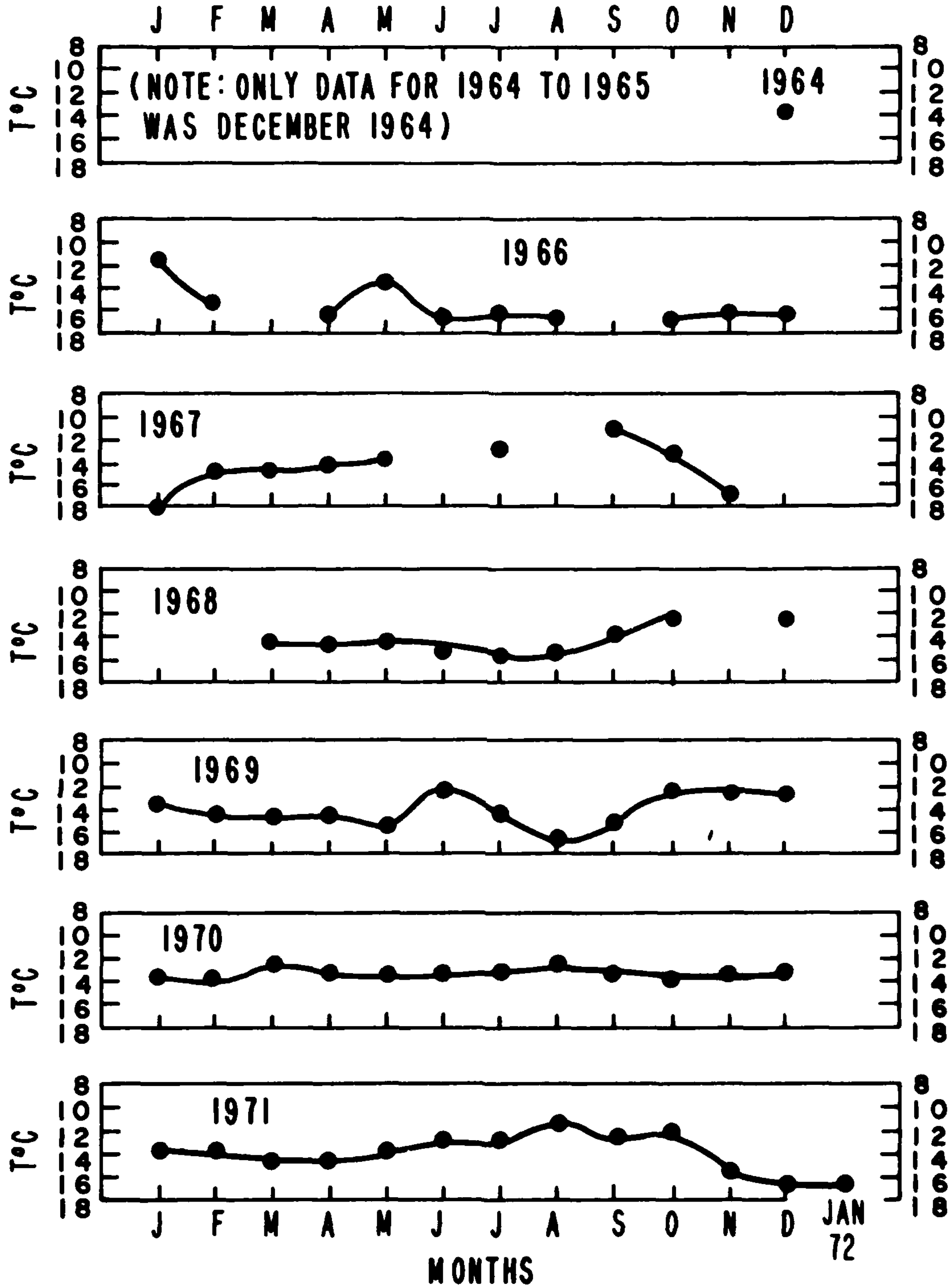


Figure 31.—The monthly mean 200 meter temperature (°C) on Ocean Station VICTOR, December 1964, and January 1966 to January 1972.

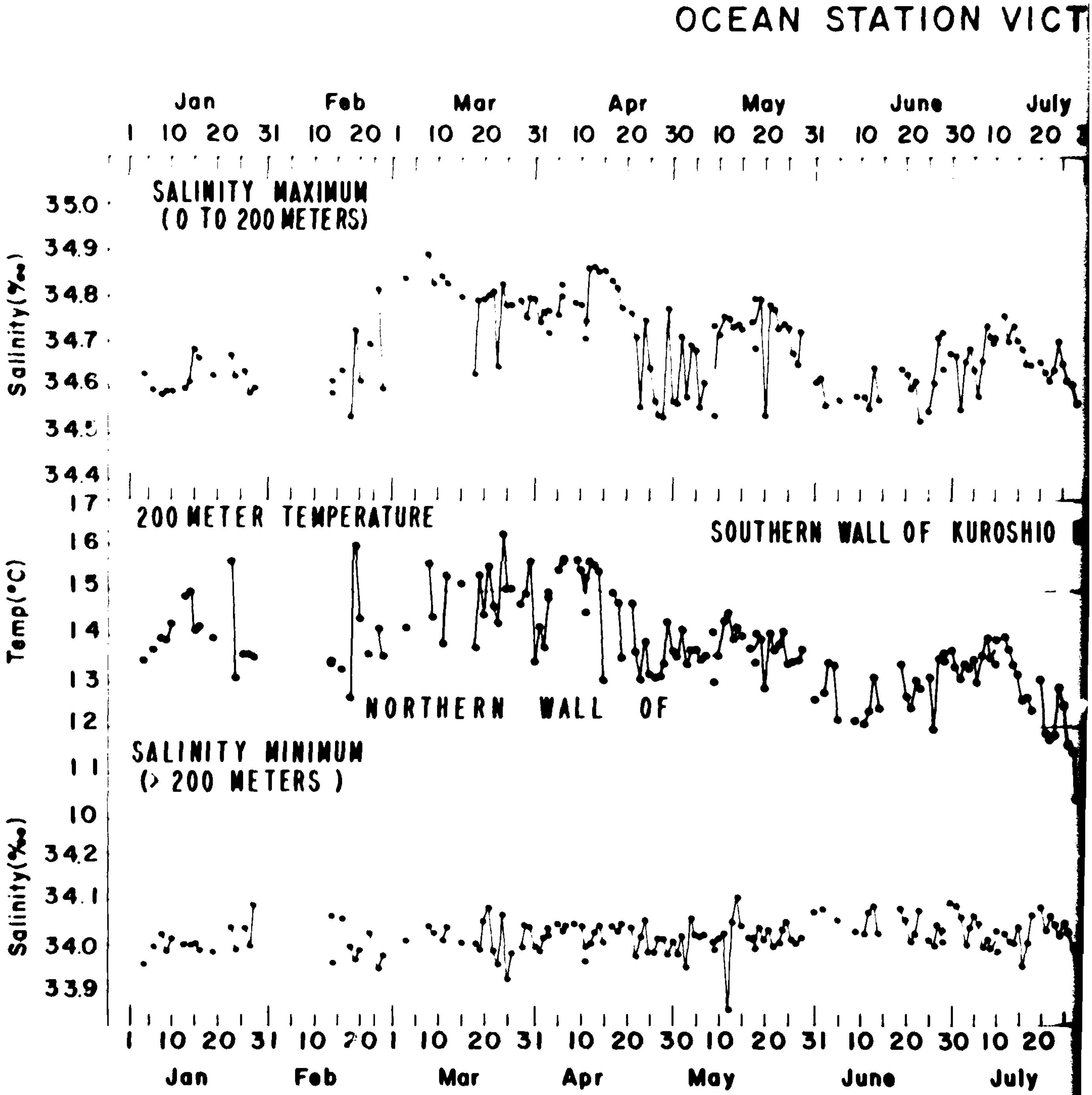
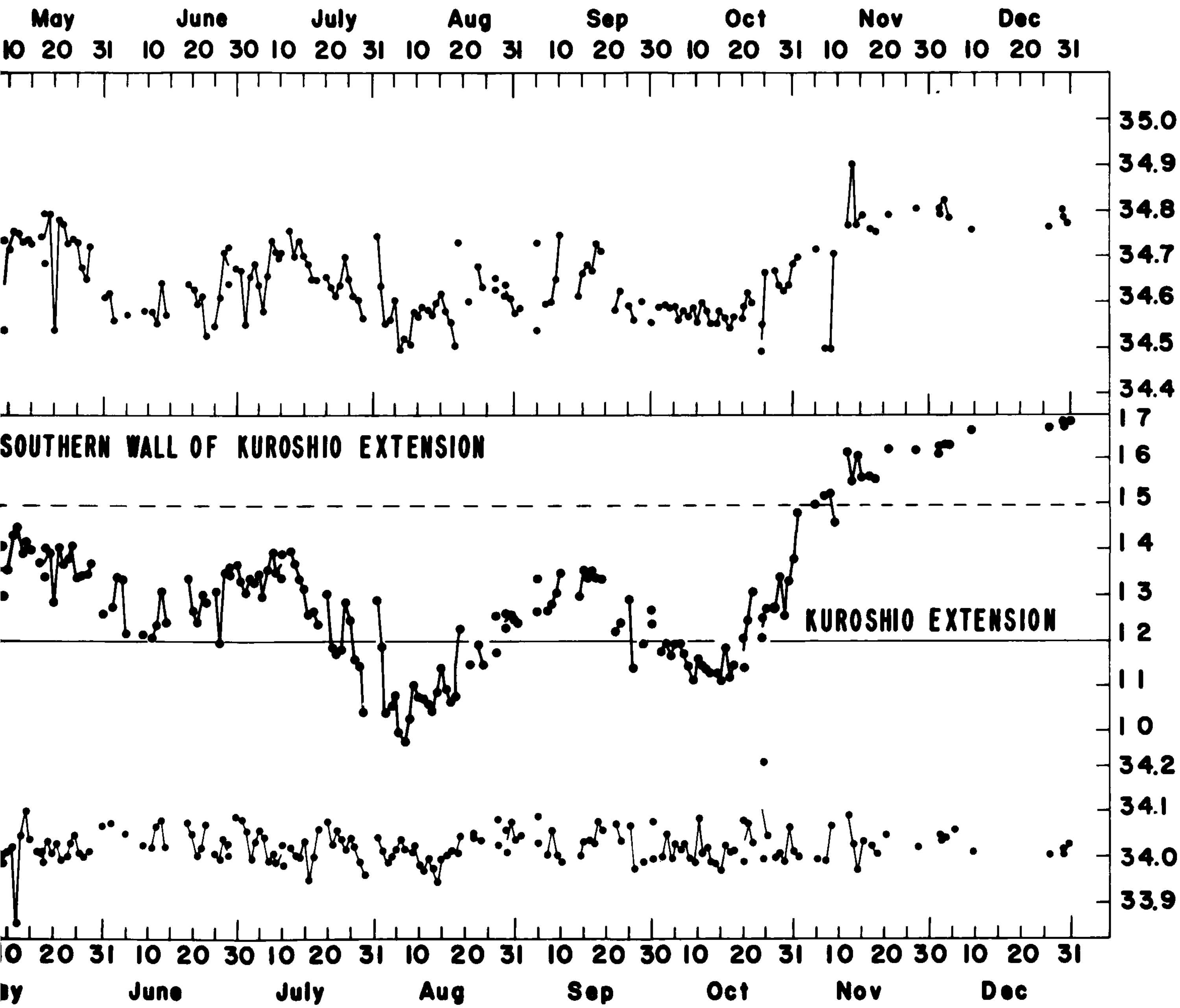


Figure 32. The salinity maximum (‰) (0 to 200 meters), the 200 meter temperature (°C), and the salinity minimum (‰) (> 200 meters) at Ocean Station VICTOR for 1971.

CEAN STATION VICTOR- 1971



APPENDIX A
OCEANOGRAPHIC DATA
OCEAN STATION VICTOR

Table I.—USCGC WACHUSETT, November 1967, NODC Listing No. 31-1198.
Table II.—USCGC KLAMATH, February—March 1968, NODC Listing No. 31-1278.
Table III.—USCGC WINNEBAGO, March 1968, NODC Listing No. 31-1242.
Table IV.—USCGC KLAMATH, March—April 1968, NODC Listing No. 31-1278.
Table V.—USCGC CHAUTAUQUA, April—May 1968, NODC Listing No. 31-1252.
Table VI.—USCGC WINNEBAGO, May—June 1968, NODC Listing No. 31-1268.
Table VII.—USCGC MELLON, June 1968, NODC Listing No. 31-1279.
Table VIII.—USCGC CHAUTAUQUA, June—July 1968, NODC Listing No. 31-1309.
Table IX.—USCGC BERING STRAIT, July—August 1968, NODC Listing No. 31-1315.
Table X.—USCGC MELLON, August 1968, NODC Listing No. 31-1313.
Table XI.—USCGC CHAUTAUQUA, August—September 1968, NODC Listing No. 31-1322.
Table XII.—USCGC BERING STRAIT, September—October 1968, NODC Listing No. 31-1346.
Table XIII.—USCGC MELLON, October 1968, NODC Listing No. 31-1345.
Table XIV.—USCGC CHAUTAUQUA, October—November 1968, NODC Listing No. 31-1344.
Table XV.—USCGC BERING STRAIT, November—December 1968, NODC Listing No. 31-1411.
Table XVI.—USCGC MELLON, December 1968, NODC Listing No. 31-1391.
Table XVII.—USCGC CHAUTAUQUA, December 1968—January 1969, NODC Listing No. 31-1412.
Table XVIII.—USCGC PONTCHARTRAIN, January—February 1969, NODC Listing No. 31-1417.
Table XIX.—USCGC BERING STRAIT, February—March 1969, NODC Listing No. 31-1427.
Table XX.—USCGC BERING STRAIT, March—April 1969, NODC Listing No. 31-1429.
Table XXI.—USCGC GRESHAM, April—May 1969, NODC Listing No. 31-1485.
Table XXII.—USCGC MELLON, May 1969, NODC Listing No. 31-1455.
Table XXIII.—USCGC GRESHAM, May—June 1969, NODC Listing No. 31-1487.
Table XXIV.—USCGC CHAUTAUQUA, June—July 1969, NODC Listing No. 31-1491.
Table XXV.—USCGC BERING STRAIT, July 1969, NODC Listing No. 31-1490.
Table XXVI.—USCGC MELLON, July—August 1969, NODC Listing No. 31-1488.
Table XXVII.—USCGC CHAUTAUQUA, August—September 1969, NODC Listing No. 31-1541.
Table XXVIII.—USCGC BERING STRAIT, September 1969, NODC Listing No. 31-1532.
Table XXIX.—USCGC CHAUTAUQUA, September—October 1969, NODC Listing No. 31-1543.
Table XXX.—USCGC WINNEBAGO, October—November 1969, NODC Listing No. 31-1573.
Table XXXI.—USCGC BERING STRAIT, November 1969, NODC Listing No. 31-1579.
Table XXXII.—USCGC WINNEBAGO, November—December 1969, NODC Listing No. 31-1575.
Table XXXIII.—USCGC BERING STRAIT, December 1969—January 1970, NODC Listing No. 31-1581.
Table XXXIV.—USCGC CHAUTAUQUA, January—February 1970, NODC Listing No. 31-1567.

Table XXXV.—USCGC WINNEBAGO, February 1970, NODC Listing No. 31-1603.
Table XXXVI.—USCGC BERING STRAIT, February—March 1970, NODC Listing No. 31-1609.
Table XXXVII.—USCGC WINONA, March—April 1970, NODC Listing No. 31-1639.
Table XXXVIII.—USCGC CHAUTAUQUA, April—May 1970, NODC Listing No. 31-1628.
Table XXXIX.—USCGC MINNETONKA, May—June 1970, NODC Listing No. 31-1660.
Table XL.—USCGC WACHUSETT, June 1970, NODC Listing No. 31-1787.
Table XLI.—USCGC MINNETONKA, June—July 1970, NODC Listing No. 31-1662.
Table XLII.—USCGC WACHUSETT, July—August 1970, NODC Listing No. 31-1789.
Table XLIII.—USCGC WINNBAGO, August 1970, NODC Listing No. 31-1767.
Table XLIV.—USCGC CHAUTAUQUA, August—September 1970, NODC Listing No. 31-1756.
Table XLV.—USCGC MELLON, September—October 1970, NODC Listing No. 31-1761.
Table XLVI.—USCGC WINNEBAGO, October—November 1970, NODC Listing No. 31-1769.
Table XLVII.—USCGC MELLON, November—December 1970, NODC Listing No. 31-1799.
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Table XLIX.—USCGC MELLON, January 1971, NODC Listing No. 31-1801.
Table L.—USCGC WINNEBAGO, January—February 1971, NODC Listing No. 31-1804.
Table LI.—USCGC CHAUTAUQUA, February—March 1971, NODC Listing No. 31-1820.
Table LII.—USCGC MINNETONKA, March 1971, NODC Listing No. 31-1845.
Table LIII.—USCGC TANEY, March—April 1971, NODC Listing No. 31-1864.
Table LIV.—USCGC MINNETONKA, April—May 1971, NODC Listing No. 31-1847.
Table LV.—USCGC TANEY, May 1971, NODC Listing No. 31-1864.
Table LVI.—USCGC WACHUSETT, May—June 1971, NODC Listing No. 31-1946.
Table LVII.—USCGC WINNEBAGO, June—July 1971, NODC Listing No. 31-1867.
Table LVIII.—USCGC WACHUSETT, July—August 1971, NODC Listing No. 31-1948.
Table LIX.—USCGC KLAMATH, August 1971, NODC Listing no. 31-1943.
Table LX.—USCGC PONTCHARTRAIN, August—September 1971, NODC Listing No. 31-1937.
Table LXI.—USCGC KLAMATH, September—October 1971, NODC Listing No. 31-1945.
Table LXII.—USCGC PONTCHARTRAIN, October 1971, NODC Listing No. 31-1938.
Table LXIII.—USCGC WINONA, October—November 1971, NODC Listing No. 31-1995.
Table LXIV.—USCGC CHAUTAUQUA, November—December 1971, NODC Listing No. 31-1960.
Table LXV.—USCGC WINONA, December 1971, NODC Listing No. 31-1997.
Table LXVI.—USCGC MELLON, December 1971—January 1972, NODC Listing No. 31-1977.

OCEANOGRAPHIC DATA
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Table LXVII.—USCGE KLAMATH, March 1968, NODC Listing No. 31-1278.

Table LXVIII.—USCGC BERING STRAIT, February—March 1969, NODC Listing No. 31-1428.

Table LXIX.—USCGC GRESHAM, May 1969, NODC Listing No. 31-1486.

Table LXX.—USCGC CHAUTAUQUA, September 1969, NODC Listing No. 31-1542.

Table LXXI.—USCGC WINNEBAGO, November 1969, NODC Listing No. 31-1574.

Table LXXII.—USCGC BERING STRAIT, November—December 1969, NODC Listing No. 31-1580.

Table LXXIII.—USCGC MINNETONKA, June 1970, NODC Listing No. 31-1661.

Table LXXIV.—USCGC WACHUSETT, June 1970, NODC Listing No. 31-1788.

Table LXXV.—USCGC WINNEBAGO, October 1970, NODC Listing No. 31-1768.

Table LXXVI.—USCGC MELLON, December 1970, NODC Listing No. 31-1800.

Table LXXVII.—USCGC MINNETONKA, March 1971, NODC Listing No. 31-1846.

Table LXXVIII.—USCGC TANEY, April 1971, NODC Listing No. 31-1864.

Table LXXIX.—USCGC WACHUSETT, June 1971, NODC Listing No. 31-1947.

Table LXXX.—USCGC KLAMATH, August 1971, NODC Listing No. 31-1944.

Table LXXXI.—USCGC WINONA, November 1971, NODC Listing No. 31-1996.

Codes Utilized

A complete description of the codes utilized in the tabulation of oceanographic station data can be found in National Oceanographic Data Center publication M-2, Processing Physical and Chemical Data from Oceanographic Stations. (Rev. August 1964, supplement issued May 1966.)

To facilitate use of the oceanographic station data listing, entry headings which are not self-explanatory are described below.

REFID	NODC reference indentity number.
CONSEC	Consecutive station number.
BOTDP (B)	Uncorrected sounding depth in meters.
SHIP (B)	NODC assigned platform identity code.
DATA USE	Entry 1 identifies DNP data.
AREA	NODC ocean area code.
CLOUD T/A (B)	Cloud type according to WMO code 0500 and cloud amount according to WMO code 2700.
Wave observations	
DIR	Direction from which dominant waves are coming in tens of degrees according to WMO code 0885.
HGT	Height of dominant waves according to WMO code 1555.
PER	Period of dominant waves according to WMO code 3155.
SEA (B)	Sea state according to WMO code 3700.
CL/TR (B)	Water color according to forel-Ule code. Transparency in meters as determined by Secchi disc.
WIND DIR (B)	Direction from which wind is blowing in tens of degrees according to WMO code 0877.
WIND SPD (B)	Wind speed in knots.
WIND FOR (B)	Wind force in beaufort code.
WEATHER (B)	Weather code—If preceded by letter X is according to WMO code 4501. A numeric two digit entry indicates weather according to WMO code 4677.
INST	Instrument used for observation—"Nansen Cast" indicates station consists of Nansen cast data—"STD Recorder" indicates station consists of STD data or a mixture of STD and Nansen cast data.
TRACE DIR (B)	"Trace" indicator U (UP), D (DOWN), and A (AVERAGED)—used with STD casts, and specify that data were taken while hoisting or lowering respectively or that the two traces were averaged.
DURATION (B)	Time elapsed during raising or lowering of the STD recorder to tenths of hours.
ORIG (B)	Originator's reference number in two parts—cruise number or 3 characters (if year of cruise forms part of cruise number years digits may sometimes only be found in "Year" field), and station number.
TEN SQ	Ten-degree square—modified Canadian square number.
5 SQUARE	Five-degree squares—modified Canadian system.
2 SQUARE	Two-degree squares—modified Canadian system.
1 SQUARE	One-degree squares—modified Canadian system.
CASTNUM (B)	Number of cast on multicast stations (blank when messenger time is given).
TIME (B)	Time of release of messenger in hour and tenths for applicable observed levels. If multicast series extends past midnight, 24 hours are added to cast time of next day. Beginning time for STD is given at first obs depth.
LVLTYP	Type of record at depth indicated. "OBS"—observed values. For STD recorder = level of data read-out. "STD"—NODC standard interpolated values. "ORG"—Standard or other depths carrying non-NODC interpolated values. "LIT"—Interpolated standard depth values used as obs for computational purposes. Note—When an observed level coincides with a STD depth level, both "STD" and "OBS" lines will appear.
DEPTH	Depth of sample (or standard level) in whole meters. Prefix "T" indicates thermometrically determined depth (depth of unprotected thermometers). Subscript "Q" indicates that the value is marked doubtful by the originator. A value designated as *implausible* by NODC is *marked* with a "P". Postscript "Z" indicates uncorrected and inaccurate 'Wire-out' depths (high wire angle present).
TEMP (B)	Temperature in degrees celsius. For 'Q' and 'P' notation see depth field
SAL (B)	Salinity in parts per thousand. For 'Q' and 'P' notation see depth field
SIGMA-T (B)	Seawater density anomaly to 2 decimal places. When depth, temp, or salinity is doubtful, a 'Q' is suffixed. An asterisk indicates a decrease of 0.02 or more from the previous level
DYNDPTH	Dynamic depth anomaly in dynamic meters to millimeters.
SND VEL (B)	Sound velocity in meters per second to decimeters according to Wilson's formula. (A standard depth-pressure term is used for stations not beginning at the surface).
OXYG (B)	Oxygen in ML/L to hundredths.